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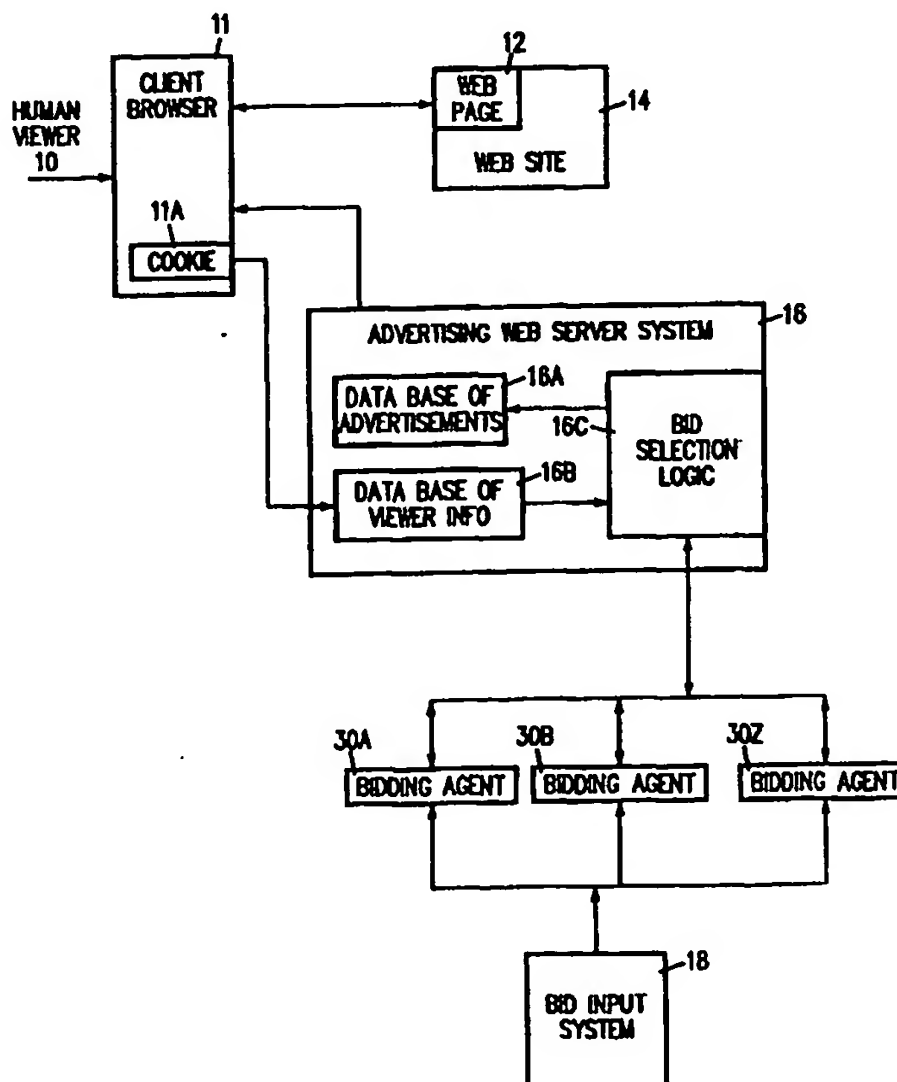
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : <b>G06F 17/60</b>		(11) International Publication Number: <b>WO 98/34189</b>
A1		(43) International Publication Date: 6 August 1998 (06.08.98)
(21) International Application Number: PCT/US98/00386 (22) International Filing Date: 9 January 1998 (09.01.98) (30) Priority Data: 08/787,979 22 January 1997 (22.01.97) US (71) Applicant: FLYCAST COMMUNICATIONS CORP. [US/US]; Suite 226, 123 Townsend Street, San Francisco, CA 94107 (US). (72) Inventors: ROTH, David, William; 3650 Fillmore Street #304, San Francisco, CA 94123 (US). SALISBURY, Dylan; 2854 Golden Gate Avenue, San Francisco, CA 94118 (US). (74) Agent: GALBI, Elmer; 13314 Vermeer Drive, Lake Oswego, OR 97035 (US).		(81) Designated States: AU, CA, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: INTERNET ADVERTISING SYSTEM

(57) Abstract

A system for providing advertisements from a central server to viewers (10) who access web sites (14). The central server stores both advertisements (16A) which are to be displayed and an information data base (16B). The data base (16B) includes information about viewers, information about the characteristics of particular web sites and other information relevant to which advertisements should be displayed for particular viewers. Proposed bids submitted by different advertisers are evaluated in real time in order to determine which particular advertisement will be displayed to a viewer. Each proposed bid can specify a price or amount that the advertiser is willing to pay for the opportunity to display an advertisement to a viewer who has a particular set of characteristics and on a web site (14) and web page (12) that meets a particular set of criteria. The system includes a web server system (16) which has data bases, bidding agents (30) which compare the characteristics of view-ops to the specifications in proposed bids and which submit bids as appropriate, and bid selection logic which decides which bid to accept for each particular view-op.



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## INTERNET ADVERTISING SYSTEM

### Field of the Invention:

The present invention relates to computer networks and more particularly to a method and system for selecting and then displaying advertisements on Internet World Wide Web sites.

### Background of the Invention:

Many web sites on the Internet World Wide Web regularly display advertisements. The particular advertisement that is displayed when a viewer accesses a web site can either be stored locally on the web site or it can be stored on a central server. (As used herein the term viewer refers to an individual who views or looks at a web page using a program such as a web browser).

The Hyper Text Transfer Protocol (HTTP) and the Hyper Text Mark Up Language (HTML) provide a mechanism whereby a web page can easily reference material located on a remote server. The HTTP mechanisms for referencing and obtaining material from a remote server is useful in providing advertising material for display to viewers. There are commercially available systems which provide advertising material for web sites from a central server and various web pages have HTML references to this central server. With such an arrangement, when a viewer accesses a web page which has an appropriate HTML reference, the viewer sees advertisement that is provided by the central server.

Using standard HTTP facilities it is possible to track when a particular viewer accesses a web site and thus it is possible to compile a data base which in essence provides a profile of the sites a particular viewer has accessed. Furthermore, it is known that particular categories of viewers generally access particular types of web sites. The capabilities

1 inherent in the World Wide Web for tracking the sites that a viewer has seen provides a  
2 mechanism for targeting particular advertisements to particular categories of viewers.

3

4 There are prior art systems which provide advertisements from a central server that has a  
5 data base of information concerning characteristics of viewers. A data base of viewer  
6 information can be compiled from a variety of sources including the information about a  
7 viewer which is available when a viewer accesses a server. In such prior art systems, the  
8 particular advertisement which is displayed when a particular viewer accesses a web site  
9 is determined by the characteristics of the viewer as provided by the data base of viewer  
10 information and by other information such as the characteristics of the web site which the  
11 viewer has accessed. Using such systems advertisers can target advertisements by  
12 criteria such as web site category, geographic location of the viewer, the operating system  
13 of the viewer's computer, the type of browser which the viewer is using, the Internet  
14 domain type of the viewer, etc.

15

16 Advertisers who use such prior art systems must specify in advance, the targeting criteria  
17 they want to use for their advertisements. The central server then provides  
18 advertisements to viewers based upon (a) the targeting criteria provided by the  
19 advertisers (b) the information which the central server has in its data base concerning the  
20 particular viewer, (c) information about the web site that has been accessed by the viewer  
21 and (d) other information available to the central server such as the time of day.

1    Summary of the present invention

2    The present invention provides an improved method and system for providing  
3    advertisements from a central server to viewers who access web sites. With the present  
4    invention the central server system stores both advertisements which are to be displayed  
5    and an information data base. The data base includes information about viewers,  
6    information about the characteristics of particular web sites and other information relevant  
7    to which advertisements should be displayed for particular viewers. In contrast to the prior  
8    art systems, the present invention evaluates, in real time, bids submitted by different  
9    advertisers in order to determine which particular advertisement will be displayed to a  
10   viewer.

11

12   The fact that a viewer has accessed a web page which has an HTML reference to the  
13   advertising server of the present invention, is herein referred to as a view opportunity or  
14   view-op. The characteristics of each view-op include the characteristics of the particular  
15   web site and web page being accessed and the characteristics of the viewer including  
16   demographic information about the viewer and information as to what other sites this  
17   viewer has accessed in various periods of time.

18

19   With the present invention each advertiser provides one or more "proposed bids" which  
20   specify how much the advertiser is willing to pay for displaying a particular advertisement  
21   in response to a view-op with certain characteristics. Each proposed bid can specify a  
22   price or amount that the advertiser is willing to pay for the opportunity to display an  
23   advertisement (a) to a viewer who has a particular set of characteristics and (b) on a web  
24   site and web page that meets a particular set of criteria. Each proposed bid can be  
25   dependent upon or require satisfaction of various criteria which must be met in order for a  
26   bid of a particular amount to be submitted. For example an advertiser might specify that

1 the first one thousand times that view-ops meeting certain criteria occurs, a bid of five  
2 cents will be submitted and each time thereafter that a view-op meeting the criteria occurs  
3 a bid of one cent will be submitted. The amount bid for a view-op can be dependent on  
4 as many criteria as the advertiser cares to specify. Another example is that an advertiser  
5 might bid ten cents if the view-op was by a viewer who had recently visited a particular  
6 web page and one cent for the same view-op if the viewer had not recently visited the  
7 particular web page. Yet another example of a parameter which could be specified in a  
8 proposed bid is the "click-through" rate for the particular site where the view-op originated.  
9 The click-through rate is the rate at which viewers click on an advertisement to access the  
10 advertiser's web site. Thus, the bidding parameters can either be simple or complex.  
11  
12 The present invention includes (a) a web server system which has data bases stored  
13 therein, (b) bidding agents which compare the characteristics of view-ops to the  
14 specifications in proposed bids and which submit bids as appropriate, and (c) bid  
15 selection logic which decides which bid to accept for each particular view-op.  
16  
17 With the present invention, when a view-op arises, the bidding agents evaluate the  
18 characteristics of the view-op compared to the specifications in proposed bids and the  
19 bidding agents submit bids to the bid selection logic where appropriate. Next, the bid  
20 selection logic selects the highest bid from the various available bids and the  
21 advertisement which is specified in the highest bid is displayed. The novel aspect of the  
22 present invention is the organization, operation and interaction between the bidding  
23 agents, the server which provides information to the bidding agents, the bid selection logic  
24 and the associated mechanisms for presenting the advertisements.  
25

1 The present invention provides a very flexible system whereby advertisers can minimize  
2 cost and maximize effectiveness while the owner of web sites can obtain the highest  
3 possible revenue for displaying advertisements on their site.

4

5 **Brief Description of the Drawings**

6 Figure 1 is a simplified system block diagram of a preferred embodiment of the invention.

7

8 Figures 2A and 2B are simplified block flow diagrams of the operation of the invention.

9

10 Figure 3 is an overall block diagram of a preferred embodiment of the invention.

11

12 Figure 4 is a diagram showing the organization of various tables which are utilized by the  
13 present invention.

14

15 Figures 5A to 5C are flow diagrams showing how each view-op is evaluated or tested to  
16 determine if a bid should be submitted.

17

18 Figures 6A to 6E are flow diagrams showing the operation of the system.

19

20 Figure 7 is a block diagram of an alternate embodiment of the invention.

21

22 **Detailed Description of embodiments of the Invention**

23 In order to explain the principles of the invention, an overall simplified diagram of a first  
24 preferred embodiment of the invention is shown in Figure 1 and a simplified block diagram  
25 of the operation of the system is shown in Figures 2A and 2B. After the principles of the

1 invention have been explained with reference to Figures 1 and 2, the first preferred  
2 embodiment of the invention is described with reference to Figures 3 to 6.

3

4 As shown in Figure 1, a human viewer 10 utilizes a client browser 11 to access a web  
5 page 12 on a web site 14. The web page 12 is transmitted to browser 11 in a  
6 conventional manner. Web page 12 includes an HTML reference to a file (i.e. an  
7 advertisement) located on an advertising web server system 16. The client browser 11  
8 has what is known in the art as a "cookie" 11A which provides information from browser  
9 11 to the web server system 16. The client browser 11, the cookie 11A, the web site 14  
10 and the web page 12 are all conventional and in widespread use. For example, the client  
11 browser 11 could be one of the commercially available web browsers, for example, the  
12 commercially available and widely used web browser marketed by Netscape  
13 Communications Corp. under the trademark "Netscape Navigator". The web site 14 and  
14 the web page 12 could be any of the thousands of web sites and web pages which are  
15 part of the World Wide Web and which have HTML references to advertisements which  
16 are located on a remote server.

17 Web page 12 includes an HTML reference to an advertisement stored on advertising web  
18 server system 16. Each time client browser 11 displays web page 12, the human viewer  
19 10 will see an advertisement which is provided by advertising web server system 16.

20 Such HTML references are in widespread use and they are implemented using  
21 conventional HTML tags. Advertising web server system 16 includes a data base of  
22 advertisements 16A, a data base of viewer information 16B, and a bid selection logic 16C.

23 The bid selection logic 16C receives bids from bidding agents 30A to 30Z which in turn  
24 receive information concerning proposed bids from bid input system 18. For purposes of  
25 illustration only three identical bidding agents 30A, 30B and 30Z are specifically shown.



1 The reference number 30 will be used to refer to a typical bidding agent. It should be  
2 understood that the system could include any number of bidding agents. For example, a  
3 system could include several thousand bidding agents 30. Bid input system 18 provides  
4 bidding agents 30 with proposed bids which specify how much should be bid for view-ops  
5 with particular characteristics. Each bidding agents 30 evaluates each view-op to  
6 determine if the view-op meets the criteria specified in a particular proposed bid and if so  
7 how much should be bid.

8  
9 Each bidding agent 30 evaluates a view-op with respect to one proposed bid to determine  
10 if a bid should be submitted. Each proposed bid includes a list of parameters which  
11 specify the particular type of viewer which the advertiser wants to reach. For example, a  
12 proposed bid might specify that the advertiser is willing to pay five cents for the  
13 opportunity to place an advertisement on a web page which is accessed by a viewer who  
14 has accessed three financial web pages and an automotive web page within the last  
15 week.

16  
17 In general the system includes one bidding agent 30 for each proposed bid (see later  
18 discussion about multi-level bids). Each advertiser would have an associated bidding  
19 agent 30 for each ad campaign the advertiser wants to conduct. Advertisers submit  
20 proposed bids to their associated bidding agents for evaluation against view-ops. Bidding  
21 agents 30 can be simple or complex and if desired they can have the ability to evaluate  
22 more than one proposed bid to determine what bid should be submitted to the bid  
23 selection logic 16C.

24

1 When a view-op presents itself (i.e. when viewer 10 accesses a web page 11 which  
2 contains an HTML reference to server system 16) the advertising web server system 16  
3 performs four operations:

4 (1) It updates the information about the viewer which is in data base 16B.

5 (2) It sends information concerning the view-op to the bidding agents 30. The  
6 information sent includes information that the server system 16 received from  
7 browser 11 and information in data base 16B. Bidding agents 30 in turn decide  
8 which bids to submit to bid selection logic 16C.

9 (3) It compares various bids received from bidding agents 30 in order to determine  
10 which advertisement to display.

11 (4) It sends the appropriate advertisement from data base 16A to browser 11.

12

13 The operations performed by advertising web server system 16 are shown in Figures 2A  
14 and 2B. Figure 2A shows how server system 16 uses the information from cookie 11A to  
15 update the data base of viewer information 16B to reflect the fact that this particular  
16 viewer has accessed this particular web page. The operations proceed as shown by  
17 blocks 201 to 203. Block 201 indicates that a viewer has selected web page 12 and that  
18 the selected web page has been transmitted to the viewer's browser 11. As indicated by  
19 block 202, web page 12 has an HTML reference to a file on server system 16 using  
20 conventional HTML techniques. Block 203 indicates that the server 16 then obtains data  
21 from cookie 11A to update the data base of viewer information 16B.

22

23 When a viewer 10 accesses web page 12, which has an HTML reference to server  
24 system 16, the present invention determines which advertisement from data base 16A to  
25 present to the viewer. The manner in which the system performs these operations is  
26 shown by block diagram 2B. For example, one advertiser might have submitted a

1 proposed bid to bidding agent 30A which specified that he is willing to pay five cents for  
2 displaying an ad to a viewer who has accessed at least three financially oriented data  
3 bases within the last week. Another advertiser might have submitted a proposed bid to  
4 bidding agent 30B specifying that he is willing to pay six cents for displaying an  
5 advertisement to a viewer that has accessed at least three financially oriented data bases  
6 with the last five days. When a view-op occurs which is initiated by a viewer 10 who has  
7 accessed three financially oriented data bases in the last five days, bidding agents 30A  
8 and 30B would determine that the particular view-op satisfies the criteria specified by both  
9 advertisers. Both bids would be submitted to bid selection logic 16C and bid selection  
10 logic 16C would then select the highest bid and the advertisement specified by that  
11 advertiser would be displayed to the viewer. The criteria specified by the advertisers may  
12 be much more complex and involve many more parameters than those given in the simple  
13 example specified above. However, notwithstanding the complexity of the proposed bids  
14 and the number of parameters specified in each proposed bid, the operations performed  
15 by bidding agents 30 and by bid selection logic 16C are as explained in the above simple  
16 example.

17

18 As shown in Figure 2B, a cycle of operation begins (block 210) when a viewer 10 selects  
19 a web page 12 which has a HTML reference to web server system 16, that is, when a  
20 view-op occurs. It is noted that this occurs in real time and it can take place thousands of  
21 times per minute. Block 211 indicates that the web server system 16 sends information  
22 concerning the view-op and related information in the data base 16B to the bidding  
23 agents 30. The bidding agents 30 compare the information about the view-op to the  
24 proposed bids that have been submitted by advertisers. That is, the bidding agents 30  
25 determine if the characteristics of the view-op meet the criteria in the proposed bids and if  
26 so they submit bids to bid selection logic 16C (block 213). As shown by block 214, the bid

1 selection logic 16C compares various bids and selects the highest bid and therefore an  
2 advertisement for display. The appropriate advertisement called for by the winning bid is  
3 then sent from data base 16A to browser 11 (block 215).

4

5 Block 212 indicates that each advertiser submits proposed bids, each of which includes  
6 various parameters which, for example, specify the type of web page on which the  
7 advertiser wants to advertise and an amount, (i.e. the dollar amount) which the advertiser  
8 is willing to pay for having a particular advertisement displayed. Details of the various  
9 parameters which can be included in a proposed bid are explained later.

10

11 In order to understand the power of the present system and its differences from the prior  
12 art, it is important to realize that the bidding agents 30 evaluate proposed bids in  
13 microseconds, that is, in real time. The rate at which "hits" on web pages occur (i.e. the  
14 rate at which viewers access web pages that have HTML reference to server system 16 )  
15 can be in the order of thousands per second. Thus, the evaluation of proposed bids is  
16 performed very quickly in real time. Proposed bids can contain parameters which specify  
17 that a proposed bid will in effect change in real time. For example a proposed bid might  
18 specify that for the first 1000 matching view-ops, the proposed bid will be five cents and  
19 for the next 1000 matching view-ops the proposed bid will be four cents. The actual  
20 submission of proposed bids by advertisers and the rate at which advertisers can change  
21 their proposed bids is measured in minutes compared to the rate at which the system  
22 evaluates proposed bids which is in the order of microseconds.

23

24 The operation of the browser 11, the operation of the web server 14 , and the manner in  
25 which web pages produce HTML references to web server system 16 using the HTTP  
26 protocol and HTML mark up language are described in numerous published books such

1 as : "HTML Source Book A Complete Guide to HTML" by IAN S. Graham, published by  
2 John Wiley and Sons (ISBN 0 471-11849-4) or "The Internet Complete Reference" by  
3 Harley Hahn and Rick Stout, published by Osborne McGraw-Hill, ISBM 0 07-881980-6.  
4 Numerous other books are also available which describe the HTTP protocol. Such books  
5 describe how a browser, such as 11, can access a web page, such as web page 12,  
6 which in turn has an HTML reference to a file (i.e. an advertisement) stored on a server  
7 such as advertising server system 16.

8  
9 A more detailed block diagram of the preferred embodiment of the invention is shown in  
10 Figure 3. Numerous additions and changes can be made in the preferred embodiment  
11 shown in Figure 3 without departing from the spirit of the invention. As will be explained  
12 later with reference to Figure 7, a number of systems, each identical to the system shown  
13 in Figure 3, (and each of which is at a different geographic location) can be  
14 interconnected into a network so as to more efficiently service view-op requests.

15  
16 As shown in Figure 3, the preferred embodiment is composed of five main units, namely,  
17 web server 310, view server 320 (servers 310 and 320 together comprise the advertising  
18 web server system 16 shown in Figure 1), identical bidding agents 30A, 30B and 30Z,  
19 bid input server 18 and log and billing unit 320A. As stated with respect to Figure 1, a  
20 system can include any number of bidding agents. A typical system could include a  
21 thousand or more bidding agents. For clarity of illustration only three bidding agents 30A,  
22 30B and 30Z are specifically shown in Figure 3. Hereinafter the term bidding agent 30  
23 will refer to one representative bidding agent. It should be understood that there could be  
24 many bidding agents 30 in a system.

25

1 Bidding agents 30 evaluate bids to determine if a particular view-op meets the criteria of a  
2 particular bid. That is, bidding agents 30 compare the specifications in a proposed bid to  
3 the characteristics of a view-op. An example of the comparison process is explained later  
4 with reference to Figure 5. Bid selection logic 16C in view server 320 determines which  
5 advertisement will be displayed, that is, which is the highest bid for each particular view-  
6 op.

7  
8 The web client browser 11 accesses web sites (such as site 14 ) using the conventional  
9 HTTP protocol. The present invention begins to function when the web page which is  
10 accessed by browser 11 contains a conventional Internet HTML reference to web server  
11 310.

12  
13 The web server 310 provides an advertisement to web client browser 11 in response to an  
14 HTML reference. Such an operation is conventional. The function of the present  
15 invention is to determine which particular advertisement from data base 16A will be  
16 provided in response to each HTML reference from web client browser 11 to web server  
17 310.

18  
19 The web server 310, view server 320, bidding agents 30 and bid input server 18 can all  
20 be implemented by computer programs that are all resident in and executed by one single  
21 physical computer. Alternatively, each of the components may be implemented in  
22 separate physical computers connected by a conventional inter-computer network. The  
23 decision concerning implementation is a single computer or in a group of interconnected  
24 computers depends upon the cost, capacity and speed of the available computers. With  
25 respect to the explanation of the operation of the present invention, it is not relevant as to

1 whether or not the various components are implemented in a single computer or in a  
2 network of interconnected computers.

3  
4 The web server 310 can be implemented using conventional commercially available web  
5 server technology. For example, the commercially available web server marketed under  
6 the tradename Zeus can be used to implement web server 310. The operating system  
7 used in web server 310 is conventional and is not described herein. It could for example  
8 be the conventional Unix operating system. Likewise view server 320 and bid input  
9 server 18 have a conventional operating system such as the Unix operating system. The  
10 processes and programs described herein run as application programs under such a  
11 conventional and commercially available operating system.

12  
13 When web server 310 receives an HTTP request or HTML reference (a view-op), it  
14 delivers the contents the view-op to the view server 320. View server 320 in turn sends  
15 information concerning the view-op to bidding agents 30. Bidding agents 30 in turn  
16 evaluate the characteristics of the view-op (which includes information supplied by server  
17 320) against the criteria specified in each proposed bid. If the characteristics of a view-op  
18 meet the criteria in a proposed bid, a bidding agent 30 will submit a bid to view server  
19 320. After receiving input from bidding agents 30 (that is from all the bidding agents 30  
20 that submit bids) the bid selection logic 16C in view server 320 selects the highest bid  
21 and indicates to web server 310 which advertisement should be displayed in response to  
22 the view-op. In response to the input from view server 320, the web server 310 delivers  
23 the appropriate advertisement to the web client 11

24  
25 Bidding agents 30 must be programmed to evaluate proposed bids in a certain amount of  
26 time and to submit actual bids to server 320 within pre-established time limits. If server

1 320 does not receive a bid from a particular bidding agent 30 within a certain time, it  
2 assumes that it will not receive a bid from that bidding agent and it selects the highest bid  
3 from the bids received from the other bidding agents.

4  
5 The main functionality or the "kernel" of the system is implemented in the view server 320  
6 and in bidding agents 30. View server 320 has a number of tables, and conventional data  
7 base functionality for querying, inserting, updating and deleting data from the tables. The  
8 data base capabilities may be implemented using a conventional commercially available  
9 Structured Query Language (SQL) data base such as one of the data bases marketed by  
10 Oracle Corp. or the data base marketed by Microsoft Corp. under the tradename  
11 "Access". Alternatively, these tables can be implemented using specially written  
12 programming which optimizes the speed of certain operations.

13  
14 View server 320 and bidding agents 30 are each objects (in the CORBA or Common  
15 Object Request Broker Request sense), they are persistent, and they can be moved  
16 across machine or network boundaries. Naturally performance is impacted depending  
17 upon whether or not these objects are implemented in one computer or in a network of  
18 connected computers. As is conventional, indexing techniques can be used in order to  
19 increase speed of operation related to the various tables.

20

21 The following terms are used herein with the following meaning:

22 Ad-Serve: Placing or "pumping" advertising content in an HTTP reply to a view-op. Note,  
23 putting advertising content in an HTTP reply results in an advertisement being  
24 displayed by a browser so that it can be seen by a Viewer.

25 Ad-Script: A script or mark up language for establishing bidding logic.



1    **Bidding Agent** A unit, computer program or agent (in the programming sense) that  
2           evaluates the characteristics of a view-op to determine if the criteria or parameters  
3           set out in a particular proposed bid meets the specifications of a particular view-  
4           op.

5    **Click-through**: The event that occurs when a Viewer clicks on an advertisement and is  
6           hyperlinked to new content.

7    **Exposure**: The number of ad serves for a particular advertisement.

8    **Frequency**: Number of times each viewer (on average) will be exposed to an  
9           advertisement. In general the frequency is equal to the total number of exposures  
10          divided by the reach number.

11   **I/CODE**: A standard identifier assigned to individual viewers. I/Codes are used as  
12          registration information by many web sites. Interact Profiles Corporation offers a  
13          commercial service which collects in-depth demographic information about viewers  
14          for whom it issues or assigns I/Codes. This information or other similar information  
15          about viewers is stored in table 16B.

16   **Internet**: The global information system that is logically linked together by a globally  
17          unique address space based on the Internet Protocol (IP). The Internet is able to  
18          support communications using the Transmission Control Protocol/Internet Protocol  
19          (TCP/IP) suite.

20   **IP Data**: Data about the viewer which is specified using the Internet protocol. The IP data  
21          about a viewer is presented to the system at view-op time in accordance with  
22          standard HTTP conventions. The IP data is defined by standard HTTP  
23          conventions and it includes: CGI (common graphic interface) variables, Browser  
24          type (e.g. Netscape), viewers URL, high-level domain (.edu, .gov, .com,, OS of  
25          viewer (MAC, Windows, etc.), host, IP address, and URL of referring Web page.

- 1    **Maximum Bid Price:** This is the maximum amount that can be specified when placing bids  
2            on behalf of a bidding agent. (see Minimize Bid).
- 3    **Minimize Bid:** This is an option that the media buyer (i.e. the person who buys the  
4            advertising) can set on or off (it is set for each media buy). If the option is set "on"  
5            then the system will try to bid the minimum amount necessary to maintain the level  
6            of buying that will ensure the desired number of impressions during the time  
7            allotted to the media buy. The amount bid will be increased as need to maintain  
8            the desired level of buying; however, it will never be increased beyond the  
9            maximum bid.
- 10   **Pre-buy:** The purchase of the right to display an advertisement in response to particular  
11       view-ops for a specified amount.
- 12   **Proposed Bid:** This is an offer to pay a particular amount for the opportunity to provide an  
13       advertisement in response to a view-op that has certain characteristics. If a view  
14       op satisfies the criteria specified in a proposed bid an actual bid (called a bid) is  
15       submitted to the bid selection logic 16C.
- 16   **Reach:** The total number of unique viewers the advertiser wants to reach with the media  
17       buy. Cannot exceed the total number of exposures.
- 18   **Recently Seen Ad Data:** Information relating to the most recent advertisements served to  
19       a unique or particular viewer.
- 20   **Spot Buy:** A decision to purchase a particular view-op for a specified amount which is  
21       made in real time.
- 22   **View-op:** The opportunity to serve an advertisement to a viewer that occurs when a web  
23       browser makes a request for content by referencing to a server. This is the basic  
24       unit of "perishable inventory" that advertisers buy.
- 25   **View-time:** The length of time that a viewer looks at an advertisement.
- 26   **Viewer:** A person who accesses a page on a web site and receives an Ad-Serve.

1 Viewer History Data: Historical data about a unique or particular viewer. This may include  
2 such information as previous viewing habits, purchases, click-throughs, etc.

3 Viewer Registration Data: Data collected by a web site (at viewer registration time)  
4 including age, sex, income, etc. The uploading of this data to the server data base  
5 is performed in non-real-time.

6 Web Avail: Seller's inventory, that is, a slot for advertising content. "Avail" is an  
7 advertising term. Web avail is the equivalent term applied to the world wide web.

8 Web Page Data: Data concerning a web page such as: keywords, stock categorizations.  
9 Also includes (non-real time) third party-supplied data, as well as data provided by  
10 the system operator with respect to traffic, pricing, etc. concerning a particular site.

11 Web Site Demographic Data: This is data about a specific web site.

12 Web Site: A term conventionally used in connection with the World Wide Web. Usually  
13 an Ad space provider (seller).

14

15 The system utilizes a number of data tables 16B which are stored in the view server 320.

16 The structure of tables 16B are shown in normalized form in Figure 4. The system also  
17 utilizes an area of memory for temporarily storing certain information. This area of  
18 memory is called the VOD area of memory. It should be understood, that as is  
19 conventional, some of the data in the tables 16B can be stored in program structures and  
20 indexes which can then be used to access the data in order to increase speed. For best  
21 performance all of the tables 16B must be located in RAM.

22

23 As shown in Figure 4, there are four tables referred to as HUD, SOD, CUD, AAD and one  
24 special area of memory referred to as VOD. The four tables and the special area of  
25 memory are:

- 1 HUD table 408: This table stores Historic Viewer Data. It indicates which sites each  
 2 viewer has previously accessed.
- 3 SOD table 409: This table identifies the previously "sold" view-ops. This table tells who  
 4 previously bought which view-ops.
- 5 CUD table 410: This table identifies viewers and their characteristics. .
- 6 AAD table 412: This table identifies every active advertiser. There is a record in this table  
 7 for every active advertiser.
- 8 VOD area of memory 415: This area temporarily holds data which is being transferred to  
 9 the bidding agents.

10 A conventional notation system is used to identify fields herein. Substructures of a main  
 11 structure are designated by using the name of the main structure, followed by a period,  
 12 followed by the name of the substructure. For example CUD.LST means the LST field of  
 13 the CUD table.

14

15 The fields in the tables shown in Figure 4 are identified using the following abbreviations:

16

17 HUD table 408 (Historic Viewer Data, which sites each viewer has previously accessed)

- |    |       |  |                          |
|----|-------|--|--------------------------|
| 18 | 1) WS | Web Site ID  | Site where ad was placed |
| 19 | 2) SP | Site Page ID   | Page where ad was placed |
| 20 | 3) CU | Current Viewer ID, this is, who saw the particular web site, the I/Code. |                          |
| 21 | 4) TI | Time Interval  |                          |
| 22 | 5) N  | Number of time the viewer CU visited the site in the time interval TI    |                          |

23

24 SOD table 409 : (who previously bought which view-ops)

- |    |       |   |                                 |
|----|-------|---|---------------------------------|
| 25 | 1) AA | An identification of the bidding agent who purchased a view-op. |                                 |
| 26 | 2) PP | Purchase Price  | Purchase price for this view-op |
| 27 | 3) CU | Current Viewer ID   | I/Code of who saw the ad        |

- 1    4)   WS      Web Site ID              where ad was placed
- 2    5)   SP      Site Page ID              where ad was placed
- 3    6)   TS      TimeStamp              when placed
- 4    7)   AC      Agent Content            ID of ad that was placed
- 5    8)   AJ      Agent Jump              ID of where click-throughs go
- 6    9)   TSC      TimeStamp when click-through happened, (0 for none)
- 7    10) VO      View-op ID each view-op has a unique ID..

8

9    CUD table 410    (viewers and their characteristics)

- 10   1)   LTS      Last Seen Time Stamp, that is, time this viewer was last seen by the system
- 11   2)   IP      Internet Protocol address (from REMOTE\_HOST)
- 12   3)   DN      Domain name Full Domain name (from REMOTE\_ADDR)
- 13   4)   CO      Cookie
- 14   5)   EA      Email Address
- 15   6)   BT      Browser
- 16   7)   CU      I/CODE data
- 17   8)   ZC      Zipcode,
- 18   9)   PDC      Parsed Domain Items    1<sup>st</sup> level, 2<sup>nd</sup> level, 3<sup>rd</sup> level parse domain items

19

20   AAD Table 412    ( identifies active advertisers)

- 21   1)   BL    BudgetLeft              Current agent's budget remaining
- 22   2)   CTL   ClickThrusLeft          Current click-through count remaining (number)
- 23   3)   VL    ViewsLeft              Current exposure count remaining (number)
- 24   4)   TE    Time Expired            Time expired (i.e. agent is "dead" or expired if not 0)
- 25   5)   AA    An identification of the bidding agent

26

27   VOD memory area 415: This is a data communication structure in memory that facilitates passing  
 28   data between objects.. When a view-op is received, data is placed in the VOD area and then

1 transmitted to the bidding agents. As an example, the following data can be placed in the VOD for  
2 transmission to the bidding agents.

3 1) Current Viewer Data

4 CO Cookie - gives information about the viewer that initiated the view-op.  
5 EA Email Addr. of viewer that initiated the view-op.  
6 C I/Code of viewer that initiated the view-op.  
7 TS TimeStamp  
8 Last Seen Time Stamp  
9 IP Internet Protocol information  
10 Full Domain Name (e.g. "sales.gm.uk")  
11 Parsed Domain Name (e.g. Top = "uk", 2<sup>nd</sup> = "gm", 3<sup>rd</sup> = "sales")  
12 I/CODE plus associated data  
13 Zipcode\*  
14 BT Browser type (e.g. "Mozilla / Unix 4.0")  
15 VO View Op ID  
16 CT Content Type, Identifies a particular type of ad that site will accept.

17 2) Data About Advertisers

18 Original and Current budget  
19 Original and Current Views budget  
20 Original and Current Click thru budget  
21 Time-Start/End  
22 advertiser ID

23 3) Site Data

24 Keywords which appear on site  
25 Site Page Ad Minimum Price  
26 Accepts content List (what will site accept e.g. java, gif; sizes)

1 Site Owner Name

2 Site URL

3 Site Title

4 Site Intra Page Title

5 4) Historic and other data from data base 16B: This is the VODX area 415A: This is a  
6 subset of the VOD structure and it is a subset of data that is in the CUD, AAD,  
7 HUD and SOD. The data in the VODX is transmitted to the bidding agents on  
8 each view-op. The data placed in the VODX can for example be: :

9 a) CUD Record Portions: Portions of CUD that exist such as domain, browser, l/code  
10 relative to a viewer associated with a view-op.

11 b) 100 SOD records where SOD.WS.SP = VOD.WS.SP That is, where site page and  
12 web site in SOD equal site page and web site in the VOD.

13 c) 100 SOD records where Customer ID (i.e. l/Code) in SOD equals Customer ID in VOD  
14 That is, sold view-op records for this Viewer.

15 d) 100 HUD records: most recent records for this CU, WS and SP.

16

17 In the above example, the historical data is in units of one hundred records. It should be  
18 understood that the number of historical records sent to the bidding agents, is established  
19 by determining the type of specification which advertisers want to put in proposed bids. If  
20 advertisers want to base the decision on whether or not to submit an actual bid on the  
21 data in more than 100 historical records, the number of historical records placed in the  
22 VOD must be larger than 100. Alternatively, in a low cost system which has a limited  
23 amount of memory, and relatively slow speed communication, the data selected for  
24 inclusion in the VOD could be less than the data listed above.

25

1 The data in the VOD is provided to the bidding agent 30 at every view-op. The bidding  
2 agents 30 can use this information to make a buy decision by comparing the criteria  
3 specified in a proposed bid with the characteristics of a view-op. All of the data that is  
4 listed above will not be available for each view-op. If certain data (i.e. data in a particular  
5 field) is not available relative to a particular view-op and a proposed bid requires that the  
6 data in the particular field have a particular value, no actual bid will be submitted by the  
7 bidding agent when the proposed bid is evaluated. The list of information or data in the  
8 VOD as given above is illustrative and any available information which advertisers feel is  
9 relevant to making buy decisions can be provided.

10

11 Some of the data in tables 16B is collected as the system operates. Other information  
12 such as information about viewers can be purchased from commercial information  
13 providers and periodically inserted into the tables 16B from an external connection.

14

15 On each view-op, that is, when each view-op occurs, bidding information is presented to  
16 each of the bidding agents 30. When a bidding agent 30 receives information about a  
17 view-op, it evaluates the view op with respect to the criteria specified in a particular  
18 proposed bid and the bidding agent then either does nothing or returns to server 320 a  
19 bid with a price and an identification of an ad to display if the bid is accepted. When a  
20 bidding agent receives information about a view-op each bidding agent 30 performs  
21 comparison operations such as those shown in block diagram form in Figure 5.

22

23 The bidding agents may be computer programs written in conventional computer  
24 languages. For example a bidding agent 30 may be a program in interpreted form, in  
25 script language (for evaluating proposed bids that are in Ad Script form) or a bidding  
26 agent may be a previously compiled program. The exact form of the bidding agents is not



1 particularly relevant to the present invention provided that the bidding agent perform  
2 comparison operations such as those shown in Figure 5. It is also noted that the bidding  
3 agents may be complex computer programs that perform various complex comparison  
4 operations in addition to or in place of the operations shown in Figure 5. However, in the  
5 preferred embodiment of the invention, the bidding agents are simple conventional  
6 computer programs that perform the type of comparison operations shown in Figure 5.

7

8 During the normal operation of the system, the process begins upon receipt of a view-op  
9 from the browser 11. Upon receipt of a view-op the system does the following:

- 10 1) An attempt is made to identify the viewer via HTTP connect information. The system  
11 seeks to determine if this viewer has been seen before. This is done using  
12 conventional and well know HTTP protocol techniques, the data in data base 16B  
13 and conventional data base technology.
- 14 2) The data concerning the viewer is used to update the table's Current Viewer Data  
15 (table 410) relative to this view-op's viewer.
- 16 3) A view-op object (VOD 415) is transmitted to each bidding agent 30.
- 17 4) The bidding agents 30 determine if the view-op meets the requirements of various  
18 proposed bids.
- 19 5) Bids are collected from the bidding agents 30 and a determination is made as to the  
20 winning bid.
- 21 6) The winning bid includes an ad index identifying the ad to be displayed. This ad index  
22 which identifies an ad in table 16A is transmitted to the web server 310 and the  
23 appropriate ad is sent to the browser 11.
- 24 7) The tables 16B are updated as to the view-op just bought (as to all view-op data of the  
25 just sold item including Historic Viewer Data such as Site, Viewer, Time seeing this  
26 exposure, etc. ).

1 8) Log and billing information is transmitted to a log and billing unit.

2

3 Time Path: The following describes the time sequence of operations that occur when a  
4 HTTP view-op request arrives from the web server 310. This can be a multi-threaded  
5 operation, that is, multiple requests might be processed simultaneously; they each  
6 maintain their own context and depend on the basic operating system (OS) for time  
7 slicing. This describes the time sequence for processing one view-op request. The  
8 following description uses symbolic values for time.

9 Time0:

10 HTTP view-op request packet received

11 Extract HTTP variables from HTTP request:

12 HTTP Query String (PATH\_INFO) WS SP

13 HTTP\_VIEWER\_AGENT

14 HTTP\_ACCEPT

15 REMOTE\_HOST == domain

16 REMOTE\_ADDR (IP)

17 REMOTE\_VIEWER

18 REMOTE\_IDENT

19 HTTP\_REFERER

20 Time1:

21 Lookup in CUD and try to match viewer

22 If success save CU and update Last Seen TimeStamp

23 If failure

24 Create new CU;

25 insert a new CUD record

26 Time2:

1           Create & build VOD object (contains view-op data for bidding agents) for the view-

2   op.

3   Time3:

4           Lookup last N (i.e. 100) SOD records for CU, and save in VOD

5   Time4:

6           Lookup last N (i.e. 100) HUD records for CU.SW.SP, save in VOD

7   Time5:

8           Remember VO ID and initiate a time-out.

9   Time 6:

10          Transmit VOD to all bidding agents.

11   After the VOD data is transmitted to the bidding agents 30, the bidding agents 30

12   evaluate proposed bids and if appropriate sent messages (bids) to view server 320.

13   These messages will be bid object data (bid price and ad ID). View server 320 collects

14   the bids and selects the highest bid. (This is done by bid selection logic 16C in view

15   server 320 which compares each bid received with the current winner of the bid compete

16   process until no further bids are received).

17   Time7:

18          Transmit winning ad index (that is the ad index from the winning bid) to web

19          server 310. The ad-index indicates which of the ads in table 16A is to be

20          transmitted to browser 11.

21   Time8:

22          Update table 16B (as to the view-op just bought);

23   Time9:

24          Insert in SOD view-op Data (as to all view-op data of the just sold item);

25   Time 10:

1           Update or Insert Historic Viewer Data (as to Site, Viewer, Time seeing this  
2 exposure).

3   Time 11:

4           Transmit Log/Billing information to the Log and billing unit 320A.

5  
6   Proposed bids are submitted to bidding agents 30 by bid input unit 18. Each proposed  
7 bid, which is submitted in the form of a programming Form Object, contains data fields  
8 such as the data fields listed below. A particular proposed bid may not have data in each  
9 of the fields of the associated Form Object. Furthermore one proposed bid may contain  
10 multiple Form Objects. That is, an advertiser may submit multiple form objects at multiple  
11 levels. For example, an advertiser may specify a level one proposal of five cents if one  
12 particular set of criteria are met and a level two proposal of four cents if other criteria are  
13 met. Each proposed bid (i.e. each form object) may contain a wide range of criteria that  
14 must be satisfied if an actual bid is to be placed. The criteria may be very stringent in a  
15 situation where the proposed bid is high and the advertiser wants to reach only a very  
16 select group of viewers. On the other hand the criteria may be loose if the bid is low and  
17 the advertiser wants to reach a large number of viewers who meet only a minimum set of  
18 criteria. For example, a proposed bid might have the single criteria such as that the view-  
19 op is from a viewer that is using the "Netscape browser". Alternatively a proposed bid  
20 might specify values for items "a", "b", "c", "e", "g", "h" and "i" listed below and specify that  
21 these values must be met before a bid is submitted for this advertiser.

22

23   Another example is that a bid might specify a set of criteria and a list of ads that are to be  
24 displayed in sequence each time a particular viewer who meets the criteria is  
25 encountered. Such a list is referred to as a "rotation" of ads. A proposed bid might also

- 1 specify that after all the ads in a rotation are displayed to a viewer, there should be a  
2 specified delay before the viewer is again shown the ads in the rotation.  
3
- 4 As an example, each form object may have the following fields (naturally it should be  
5 understood that these are merely illustrative and the number and description of actual  
6 fields is merely limited by the advertiser's desires concerning what criteria the advertiser  
7 cares to specify in a proposed bid.):
- 8 a) Frequency: that is, the number of Ad serves for one unique viewer of this ad
  - 9 b) Include sites list (those sites that are acceptable to the advertiser)
  - 10 c) Exclude sites list (those sites that are not acceptable to the advertiser)
  - 11 d) Maximum bid .....(in no event can the bid be larger than this amount)
  - 12 e) Keywords for site (words that must be in the site if a bid is to be submitted)
  - 13 f) Keywords for site-page (words that must be on the page)
  - 14 g) Times: Dayparts/Weekparts (when can ad be placed)
  - 15 h) Viewer OS (operating system viewer must have)
  - 16 i) Viewer Zipcode
  - 17 j) Viewer US State
  - 18 k) Viewer Domain (.com, .edu, .gov, .mil, .org)
  - 19 l) Viewer ISP
  - 20 m) Viewer Country
  - 21 n) Viewer SIC code
  - 22 o) Viewer # of employees
  - 23 p) Viewer Annual Revenues.
  - 24 q) Viewer Browser (what browser viewer must have)
  - 25 r) Inter-ad Delay (minimum time between placement of ads to a particular  
26 viewer)

- 1     s) Rotation Delay                   (delay between placement of ads which are part of a series)
- 2     t) List of ads in a rotation   ..(a list of ads that are placed in sequence ,see example below)
- 3     u) Other                           (Other criteria that advertiser may care to specify. Naturally,
- 4                                       the bidding agent which receives a proposed bid must be
- 5                                       programmed to compare the criteria specified in a bid to the data
- 6                                       available concerning a view-op)

7

8     Bidding input server 18 includes a conventional data input program that allows entry of

9     proposed bids with fields such as those listed the above. Each proposed bid is

10    transmitted to a bidding agent 30. There is one bidding agent 30 for each proposed bid

11    that is submitted. A system may include thousands of bidding agent programs 30. It

12    should be understood that bidding agents 30 are conventional computer programs that

13    evaluate proposed bids against the characteristics of a view-op to determine if a bid

14    should be submitted to view server 320.

15

16    Bid input system 18 also transmits information to view server 320. For example the

17    budget and identity of each advertiser is transmitted from bid input server 18 to AAD table

18    412. Entry, transfer and storage of such information is done using conventional data

19    base techniques.

20

21    In the particular embodiment of the invention shown herein, the bidding agent programs

22    30 perform the operations shown in Figure 5 relative to each level of each proposed bid.

23    As previously indicated each proposed bid may include several bid levels. All of the

24    above elements are repeated in each element. The process shown in Figure 5 is

25    executed for each level of each proposed bid. The Level 0 level is "run" first, the Level 1

26    next, and so on. This means that level 0 requirements are evaluated first. If they

1     succeed, the bid is placed as dictated in that level's data. Otherwise Level 1 requirements  
2     are checked, and so on. Each level's requirements can be totally independent, but  
3     preferably they should get successively less strict, such that the proposed bid value  
4     decreases.

5

6     The program shown in Figure 5 is executed for every view-op. It first uses the  
7     specifications for Level 0, then on "NEXT," or a failure to meet criteria for a level, it starts  
8     over with the next level's criteria. The proposed bid evaluation program shown in Figure  
9     5 performs tests such as the tests shown below upon a proposed bid prior to submitting  
10    an actual bid to view server 320. It should be understood that the test below are merely  
11    illustrative and any variety of tests can be performed in comparing the characteristics of a  
12    view-op with the specifications in a proposed bid. The tests required is limited solely by  
13    the desires of the advertiser. Programming for performing such tests and comparisons  
14    between specified characteristics of a view-op and specifications in a proposed bid is  
15    conventional programming. In the illustration given in Figure 5, the following tests are  
16    performed by the bidding agent program.

17    Block 501: If Include site List is specified and WS (Web Site ID) is not in Include site List  
18       go to DONE, if not go to next test.

19    Block 502: If Exclude site List specified and WS (Web Site ID) in Exclude site List go to  
20       DONE, if not go to next test.

21    Block 503: If Browser specified and no match with Browser being used, go to DONE, if  
22       not go to next test.

23    Block 504: If MIN site bid < MAX Agent bid go to DONE, if not go to next test (note that a  
24       web site can specify a minimum amount (Min site bid) that the site will accept for  
25       displaying an advertisement).

26    Block 505: If Viewer OS specified and no match go to DONE, if not go to next test.

- 1 Block 506: If Viewer Zipcode specified and no match go to DONE, if not go to next test.
- 2 Block 507: If Viewer US State specified and no match go to DONE, if not go to next test.
- 3 Block 508: If Viewer Domain specified and no match go to DONE, if not go to next test.
- 4 Block 509: If Viewer ISP specified and no match go to DONE, if not go to next test.
- 5 Block 510: If Viewer Country specified and no match go to DONE, if not go to next test.
- 6 Block 511: If Viewer SIC code specified and no match go to DONE, if not go to next test.
- 7 Block 512: If Viewer # of employees specified and no match go to DONE, if not go to next
- 8 test.
- 9 Block 513: If Viewer Annual Revenues specified and no match go to DONE, if not go to
- 10 next test.
- 11 Block 514: If Time List specified and current time not in Time List go to DONE, if not go to
- 12 next test.
- 13 Block 515: If Keywords list specified and Keywords not in Site Keywords List go to DONE,
- 14 if not go to next test.
- 15 Block 516: If MAX Agent click-through bid specified and MIN site click-through bid then if
- 16  $\text{MIN site click-through bid} < \text{MAX, Agent click-through bid}$  go to DONE, if not go to
- 17 next test.
- 18 Block 517: If No CT (content type) match in Ad list go to DONE, if not go to next test.
- 19 Block 518: If InterAd Time Interval specified then Compute (block 519) (scan for)
- 20 LastAdViewer for this CU (Last time this viewer saw an ad fulfilled from this agent)
- 21 from SOD List of 100.
- 22 Block 520: If InterAd Time Interval and if TimeStamp of LastAdViewer  $<$  Inter Ad Time
- 23 Interval go to done, if not go to next test.
- 24 Block 521: If Frequency specified perform block 522, that is, Count (scan) SOD per CU for
- 25 ads sold by this agent. (Block 522A) If this count  $>$  Frequency go to DONE, if not
- 26 go to next test.



- 1 Block 523 If no LastAdViewer (no record of serving this Viewer) go to done, if not go to
- 2 next test.
- 3 Block 523A if InterAdTimeInterval specified then if TimeStamp of Last Ad Serve < Inter Ad
- 4 Time Interval go to DONE, if not go to next step.
- 5 Block 524: TRY TO BUY AD with the following steps:
- 6 Block 525: Select Next Ad to Serve based on CT match, LastAdViewer or Last Ad Served
- 7 Block 526: Submit BID: Include in the bid submitted to view server 320, the ad ID in the
- 8 form of an index that can be used by web server 310 to select a bid from ad table
- 9 16A for display.
- 10 Block 528: The process is DONE
- 11
- 12 The process that the web server 320 follows when it receives a view-op is shown in
- 13 Figures 6A to 6E. The process includes the following steps:
- 14
- 15 Begin Process Figure 6A:
- 16 Block 601: The process begins when the view server 320 receives aViewOpDrive() call.
- 17 That is when Raw view-op Data is sent to view server 320.
- 18 Block 605: Establish an area in memory for VOD structure (we will write to this area)
- 19 Block 606: Parse the Domain
- 20 Block 607: Parse Accepts (map this to CT)
- 21 Block 608: Parse the Browser field
- 22 Block 609: Write SP, WS, and Cookie to the VOD
- 23 Block 610: Create New view-op record in SOD
- 24 Block 611: Write available information about view-op to new record in SOD
- 25 Block 612: Write TS to SOD
- 26 Block 614: Check to see If Cookie = 0 (Is there a Cookie in the request)

- 1 Block 615: If Cookie = 0 select on CUD where there is a Cookie match
- 2 Block 616: If Cookie not = 0 Select on CUD using other heuristics of viewer
- 3 Block 617: Set (or clear) VOD.CU
- 4 Block 620: check if there is a current viewer.
- 5 Block 621: if CU = 0 Insert new viewer in CUD
- 6 Block 623 Insert the new CUD rec. in CUD
- 7 Block 622: Write CUD record to VOD
- 8 Block 630: Select from SOD where CU = VOD.CU for 100 order by TS into VOD and go to
- 9 next procedure. This selects the 100 most current purchases that were presented
- 10 to the particular viewer. Write to VOD
- 11 Block 631: Select from HUD where CU,SP,SW all match for 100 most recent records in
- 12 VOD. Write to VOD
- 13 Block 632: Select from AAD for every active budget. Write to VOD (Write any other data
- 14 needed by bidding agents to VOD)
- 15 Block 634 Send VOD data to Bidding Agents. Each bidding agent run its logic (see
- 16 Figure 5)
- 17 Block 635: Bidding agents send result to View Server 320
- 18 .(This following is the process where bid selection logic 16C in view server 620
- 19 picks the best bid)
- 20 Block 641: Pick maximum bid
- 21 Block 642: Update AAD data
- 22 Block 643 Check for expiration of bidding agent in AAD table
- 23 Block 644: Set VOD info to winner and go to next procedure.
- 24 Block 645: check if CUD exceeds its maximum.
- 25 Block 646 if block 645 answer is yes, Select oldest CUD record, Post it to a CUD archive
- 26 file.

- 1 Block 650: check if CUD > MAXSIZE .
- 2 Block 651: If block 650 answer is yes, Delete oldest CUD record and proceed.
- 3 Block 653: Compose the SOD record from VOD data.
- 4 Block 654: Insert SOD record.
- 5 Block 655: check if count of SOD records > MAXSIZE: if no go to next procedure.
- 6 Block 656: If block 655 answer is yes, Select oldest SOD record , POST it to an archive
- 7 file and go to next procedure.
- 8 Block 660: check if count of SOD records > MAXSIZE, if answer is no, go to next
- 9 procedure
- 10 Block 661: If answer to block 660 is yes, delete oldest SOD record.
- 11 Block 662: Select from HUD for CU, SP, SW, current time interval. That is, select for this
- 12 current viewer, for this bidding agent, on this web site, for this time interval.
- 13 Block 663: Write data to VOD and go to next procedure .
- 14 Block 664, Check if HUD Rec == 0 That is, if HUD record was found
- 15 Block 665, If no HUD record found, Insert New HUD rec .
- 16 Block 666: If HUD record was found, Update existing HUD rec.
- 17 Block 670: check if new Hud Rec was inserted and count > MAXSIZE .
- 18 Block 671: If answer to block 670 is yes, Delete oldest HUD rec.
- 19 Block 672: Create Accounting Rec. from VOD data.
- 20 Block 673: POST the data to an archive file
- 21 Block 674: Post ad info to web server 310. That is, tell web server 310 which ad to
- 22 display.
- 23 Block 675: Dequeue, Delete the VOD. This is the end of the procedure. It starts again at
- 24 the next view-op.
- 25

1 The series of steps shown in Figures 6A to 6S are the procedural operation performed by  
2 the view server 320. These can be programmed using any of the conventional  
3 programming languages such as SQL. The particular computer used to perform the  
4 program is of no particular consequence so long as it is fast enough to provide a  
5 reasonable degree of performance. In order to speed the operation of the system if there  
6 is a large number of bidding agents 30, the bid selection logic 16C may be implemented  
7 using hard wired logical circuitry rather than by utilizing a computer program. The  
8 programming or circuitry in bid selection logic 16C is conventional. It merely receives the  
9 bids from each of the bidding agents 30 and selects the highest bid and then transfers the  
10 ad index for this bid to web server 310 and transfers other information about the bid to the  
11 data tables 16B and to log and billing unit 320A.

12

13 Web Server 310: The web server 310 is a conventional web server which is programmed  
14 to provide two main functions:

15 1) Answer and hold the state of each HTTP request; deliver the view-op to the system  
16 kernel in view server 320; receive the system kernel reply and deliver the content.  
17 This is a multi-task operation. The contents (the IP data) of each view op, along  
18 with its type (either a request for content or a click-through) are delivered to the  
19 view server 320. This communication is through shared memory or alternatively it  
20 may be through a conventional inter-computer network.

21 2) Install and remove Ad content separately, and asynchronously. Service requests to  
22 install (store) and remove (delete) ads from data base 16A. On an install, the web  
23 server returns a WC, a handle or index to the location of the ad. WCs should be  
24 unique for the life of the system. This is done by a conventional data base  
25 program.

26

1 Bid input server 18 is a conventional data base server which accepts information and  
2 delivers it to the tables in view server 320 and to bidding agents 30. Bid input server 18  
3 provides a data input mechanism for the system. Data table 18-T in bid input server 18  
4 stores the identity of each of the advertisers and the particular bidding agents 30 to which  
5 bids from that advertiser should be sent. Bidding agents 30 can all be identical or  
6 alternatively some may have capability for evaluating more complex criteria in proposed  
7 bids. The data table 18T stores information which indicates which bidding agent should  
8 receive proposed bids from which advertisers. Bid input Server 18 is a conventional data  
9 base input unit.

10

11 The log and billing unit 320A is a conventional data base program that provides  
12 conventional log and billing functions. As concerning users and web sites becomes old  
13 and stale, it is transmitted to an archive in log and billing unit 320A. A log of all  
14 transactions that takes place in the system is also maintained by unit 320A. This is done  
15 using conventional programming techniques.

16

17 In the figures, only one web browser 11 is shown. It should be understood that web  
18 browser 11 is merely representative of the web browsers connected to the Internet world  
19 wide web. Web server 310 is connected to the Internet and hence it can receive HTML  
20 references from any of the millions of browsers connected to the Internet. Web browser  
21 11 is merely illustrative of one of the browsers connected to the Internet.

22

23 The specifics of the various data bases, the specifics of the various fields in the data  
24 bases, and the specifics of the form used to submit a bid, the parameters that are  
25 considered in evaluating bids, as shown herein are illustrative only and various changes  
26 in the data bases, the fields and the parameters along with changes in the operation of

1 these details of the system could be made without departing from the spirit and scope of  
2 the invention.

3

4 Specific data can be introduced into data base 16B in a number of ways. Some of the  
5 data is collected as previously described as the system operates. Other data can be  
6 viewer registration data, that is data obtained when viewer register at related web sites.  
7 Likewise viewer history data in data base 16B can be collected as the system operates or  
8 it can be purchased from commercial sources and entered into data base 16B as a batch  
9 of information. Web site demographic data can be collected from commercially available  
10 sources and entered into data base 16D.

11

12 The specific data collected in data base 16B is determined by the criteria that advertisers  
13 want to establish in proposed bids. Data base 16B can store any type of information that  
14 advertisers care to specify in proposed bids. Any data that advertisers want to use in  
15 setting specifications in proposed bids can be stored in tables 16B using conventional  
16 data base technology. This data is transferred to the VOD area of memory and to the  
17 bidding agents 30 when a view-op occurs. Bidding agents 30 must be programmed to  
18 compare the data received from the VOD to the specifications in a proposed bid to  
19 determine if an actual bid should be submitted.

20

21 It is herein assumed that a viewer always accesses the world wide web using the same  
22 browser, so that the cookie in a browser accurately reflects what a viewer has done. It is  
23 also assumed that only one viewer uses a particular browser, again so that the cookie in  
24 the browser accurately reflects what the particular viewer has done. If different individuals  
25 use different sign-on names with the same browser, or if different individuals who use the

1 same browser otherwise identify themselves to the system, they can be assigned  
2 separate I/codes even though they use the same browser..

3

4 It is also noted that a system could combine the operation of the present invention with  
5 the operation of the prior art type of system where access to advertising on particular web  
6 sites is sold for a specified amount. An operator of the system could sell "pre-buys", that  
7 is, access to the view-ops that occur on a particular site and the operator could insure that  
8 a particular advertiser always has access to these view-ops as done by the prior art  
9 systems. This could be done by merely entering into the system proposed bids with a  
10 value that is the maximum allowed by the system for those particular view-ops that are  
11 sold as pre-buys.

12

13 An alternative embodiment of the invention is shown in Figure 7. The system shown in  
14 Figure 7 is designed to minimize latency due to Internet topographical distance between  
15 units.

16

17 The embodiment shown in Figure 7 is a geographically distributed system which includes  
18 three systems 716A, 716B and 716C each of which are identical to systems 16 shown in  
19 Figures 1 and 3. Each of the systems 716A, 716B, and 716C have associated bidding  
20 agents 730A, 730B and 730C. Each of the systems 716A, 716B and 7126C is located a  
21 different geographic area.

22

23 Client browser 711 sends web HTML references (such as those sent from browser 11 to  
24 web server 310) to a commercial Internet service provider (an ISP) 712. The ISP in turn  
25 sends an HTML reference to the system 716A, 716B or 716C which is "topographically"  
26 closest to the browser 711. For example, the three systems 716A, 716B and 716C could

1 be located on different continents, one in the U.S., one in Europe and one in Japan. With  
2 the system shown in figure 7, HTML references from browsers in Europe would be  
3 directed to the system in Europe, HTML references from browsers in the U.S. would be  
4 directed to the system in the U.S. etc. The bid input unit 718 sends each proposed bid to  
5 bidding agents 730 associated with each system. Thus, the systems 716A, 716B and  
6 716C evaluate each proposed bid against the particular view-ops that are directed to each  
7 particular system. While for purposes of illustration, three systems 716A, 716B and 716C  
8 are shown, any number of such systems could be connected in an overall network of  
9 systems.

10

11 While the invention has been shown and described with reference to preferred  
12 embodiments thereof, it should be understood that other embodiments are possible and  
13 that various changes in form and detail may be made without departing from the spirit of  
14 the invention. The scope of the invention is limited solely by the appended claims.

15

16

17 I claim:



1  
2 1. A system for supplying advertisements for display during a series of viewing  
3 opportunities (view-ops) which occur during the display of web pages on the  
4 Internet world wide web, each of said view-ops having specific characteristics,  
5 a plurality of bidding agents,  
6 a server for providing information concerning each view-op to said bidding agents,  
7 a bid input system for providing proposed bids to said bidding agents, each proposed bid  
8 including, a reference to a specific advertisement, specifications of a desired view  
9 op and a monetary amount which will be paid for displaying said specific  
10 advertisement in response to a view-op which meets said specifications of a  
11 desired view-op,  
12 each of said bidding agent including logic for submitting a bid and a reference to a  
13 specific advertisement to said server if the information concerning a view-op  
14 satisfies the specifications of a desired view-op contained in a proposed bid, and  
15 said server including bid selection logic for selecting the highest bid submitted by a  
16 bidding agent and for transferring the advertisement referenced in said highest bid  
17 to the web site presenting said view-op.

1  
2 2. A server system for providing advertisements in response to HTML references from a  
3 web page, each HTML reference includes information identifying the source of  
4 said web page, said server system including,  
5 a data base of advertisements,  
6 a data base of viewer information including information concerning prior HTML  
7 references,  
8 means for accepting proposed bids which specify a monetary amount for providing a  
9 particular advertisement in response to web page HTML references which satisfy  
10 specified criteria, said specified criteria including information included in said  
11 HTML reference and information from said data base of viewer information,  
12 means for determining if a particular HTML reference satisfies said specified criteria,  
13 means for selecting the highest bid which satisfies said specified criteria, and  
14 means for responding to said HTML reference with the particular advertisement specified  
15 by said selected bid.

1

2 3. A system for placing advertisements on web pages on the world wide web which are

3 accessed by a viewer,

4 a first server which stores advertisements, said web pages having HTML references to

5 said first server,

6 a data base of information on viewers,

7 bid input means for accepting bids to place advertisements on web pages which have

8 particular characteristics and which are accessed by viewers having particular

9 characteristics, and

10 bid selection means for selecting the highest bid for placement of an advertisement on a

11 particular web page.

12

13 4. A system for displaying advertisements to viewers who access a web page comprising

14 a web server which stores a plurality of advertisements,

15 bid input means for providing to said system bids specifying characteristics of users and

16 web sites where it is desired to display advertisements and a dollar bid for the right

17 to display an advertisement on a site with the specified characteristics

18 a server system which includes means for evaluating bids, for selecting one of said

19 advertisements in response to said bids and for designating to said web server

20 which of said advertisements should be displayed,

21 whereby the particular advertisement that is displayed to a viewer is determined by a

22 bidding process.

1

2 5. In an Internet which is operating according to the HTTP protocol, and which includes a  
3 browser for viewing web pages and for HTML referencing to remote servers,  
4 a server which has stored therein a number of advertisements,  
5 means for providing to said system bids for the opportunity to display advertisements on  
6 web pages which have been accessed by a viewer having specified  
7 characteristics,  
8 selection means for evaluating said bids and comparing them to the characteristics of a  
9 viewer that accesses a web page, said selection means including means for  
10 selecting the highest bid for a particular view-opportunity.

11

12 6. A method of placing advertisements on web pages on the world wide web which are  
13 accessed by a viewer utilizing a browser,  
14 storing advertisements in a data base on a first server, said web pages having HTML  
15 references to said first server,  
16 maintaining a data base of information on viewers,  
17 accepting bids to place advertisements on web pages which have particular  
18 characteristics and which are accessed by viewers having particular  
19 characteristics,  
20 selecting the highest bid for placement of an advertisement on a particular web page.

1

2 7. A system for placing advertisements on web pages on the world wide web, said web

3 pages being accessed by viewers, each viewer utilizing a browser,

4 a first server which stores advertisements, said web pages having HTML references to

5 said first server,

6 a data base of information on viewers and on the web sites that have been accessed by

7 particular browsers,

8 bid input means for accepting bids to place advertisements on web pages which have

9 particular characteristics and which are accessed by particular browsers which

10 have been previously used to access web pages having particular characteristics,

11 bid selection means for selecting the highest bid for placement of an advertisement on a

12 particular web page which has particular characteristics and which has been

13 accessed by a browser which previously has accessed particular web sites.

14 8. The system recited in claim 7 where said world wide web is accessed by using HTTP

15 protocol on the Internet.

16 9. A system for determining which advertisement to place on a web page that has been

17 accessed by a viewer using a browser,

18 a first web server which has stored thereon advertisements, said web page having a

19 HTML reference to said first web server,

20 a client server which provides means for entering bids to place particular advertisements

21 on particular web pages which have particular characteristics and which are

22 accessed by particular browsers which have previously accessed particular web

23 pages,

24 a viewer data base which has information concerning which web pages have been

25 accessed by particular browsers,

1 a view server which evaluates the bids which have been entered and selects the highest  
2 bid for displaying an advertisement on a particular web page.

3

4 10. The system recited in claim 9 including a server which includes means for checking  
5 bids to determine if web page meets the specifications in a particular bid.

6 11. The system recited in claim 9 wherein a determination of which advertisement to place  
7 on a particular web page is done in machine real time and said bids are entered in  
8 human real time.

9 12. The system in claim 9 wherein said viewer data base includes information about  
10 viewers.

11 13. A method for placing advertisements on web pages on the world wide web, said web  
12 pages being accessed by viewers, each viewer utilizing a browser,

13 storing advertisements on a first server, said web pages having HTML references to said  
14 first server,

15 storing a data base of information on viewers and on the web sites that have been  
16 accessed by particular browsers,

17 providing bids to place advertisements on web pages which have particular characteristics  
18 and which are accessed by particular browsers which have been previously used  
19 to access web pages having particular characteristics,

20 selecting the highest bid for placement of an advertisement on a particular web page  
21 which has particular characteristics and which has been accessed by a browser  
22 which previously has accessed particular web sites.

23

24 14. The system recited in claim 1 wherein each view-op has an associated viewer and  
25 said server includes a data base of information concerning viewers.

26

1 15. The system recited in claim 1 wherein said server includes a data base with  
2 information about web sites.

3

4

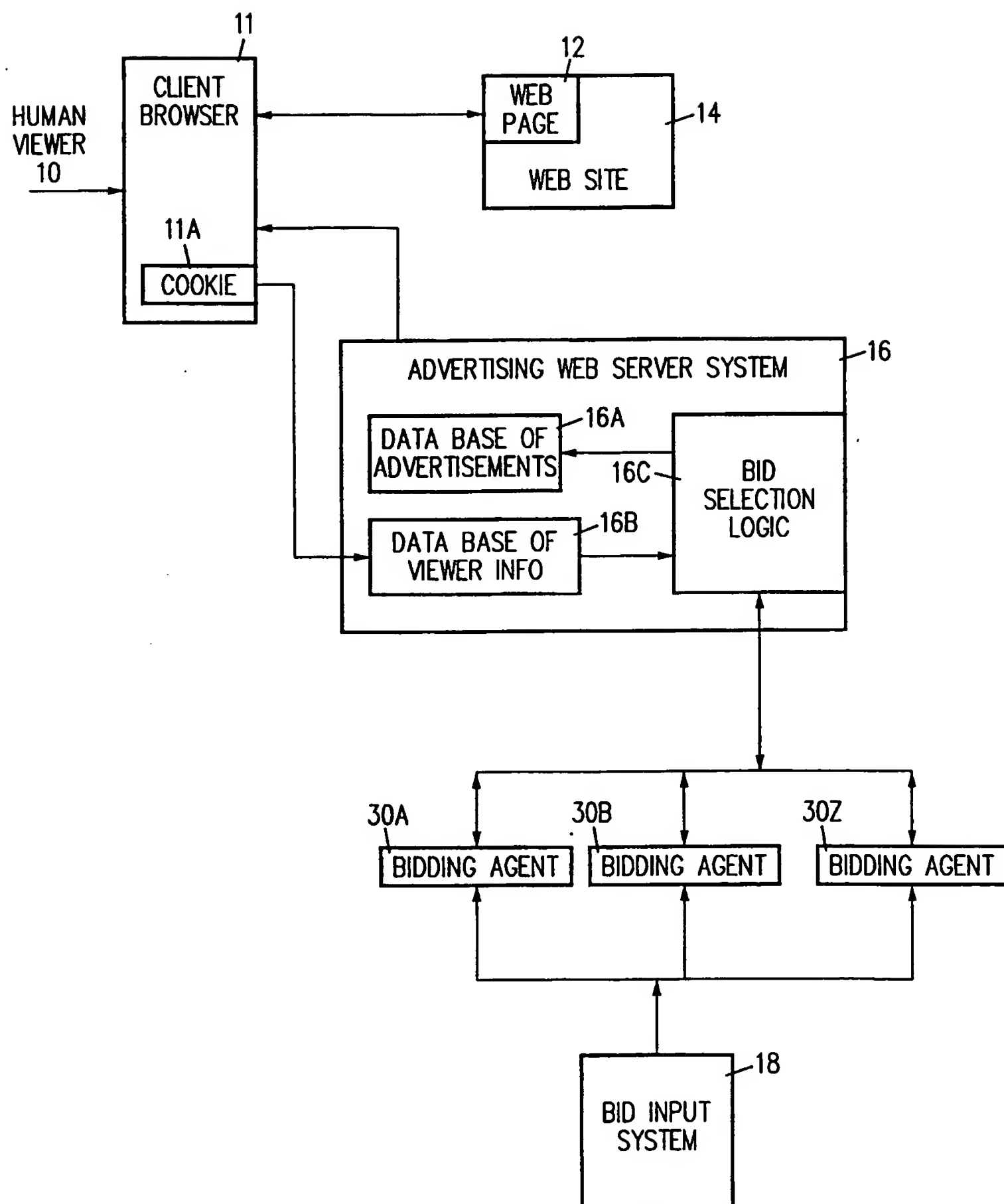


FIG. 1



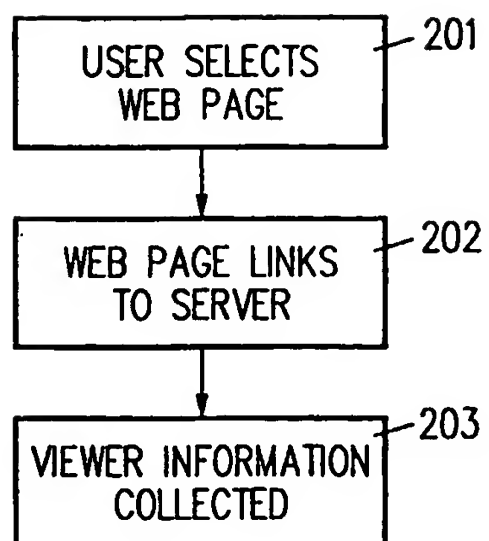


FIG. 2A

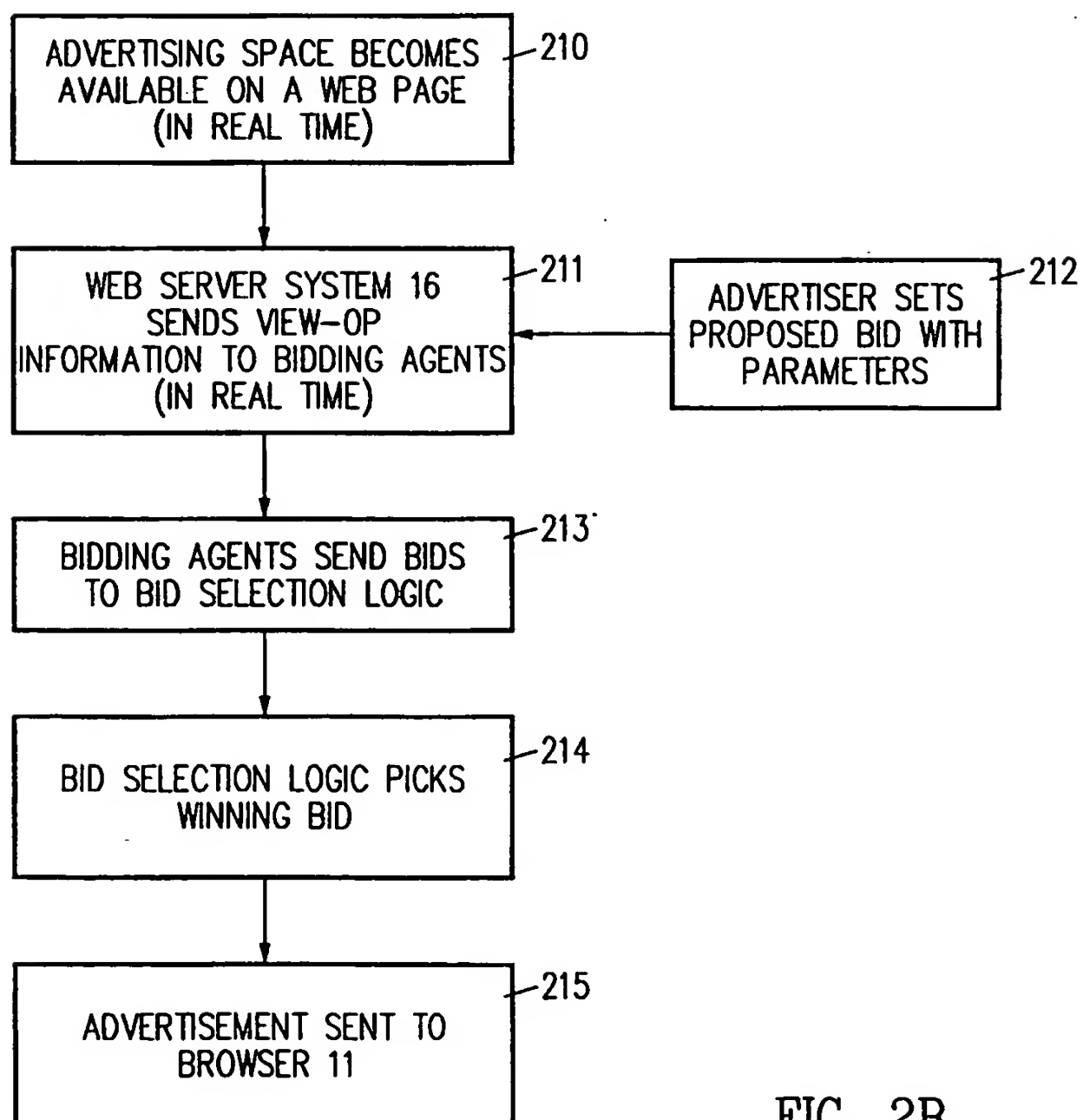


FIG. 2B

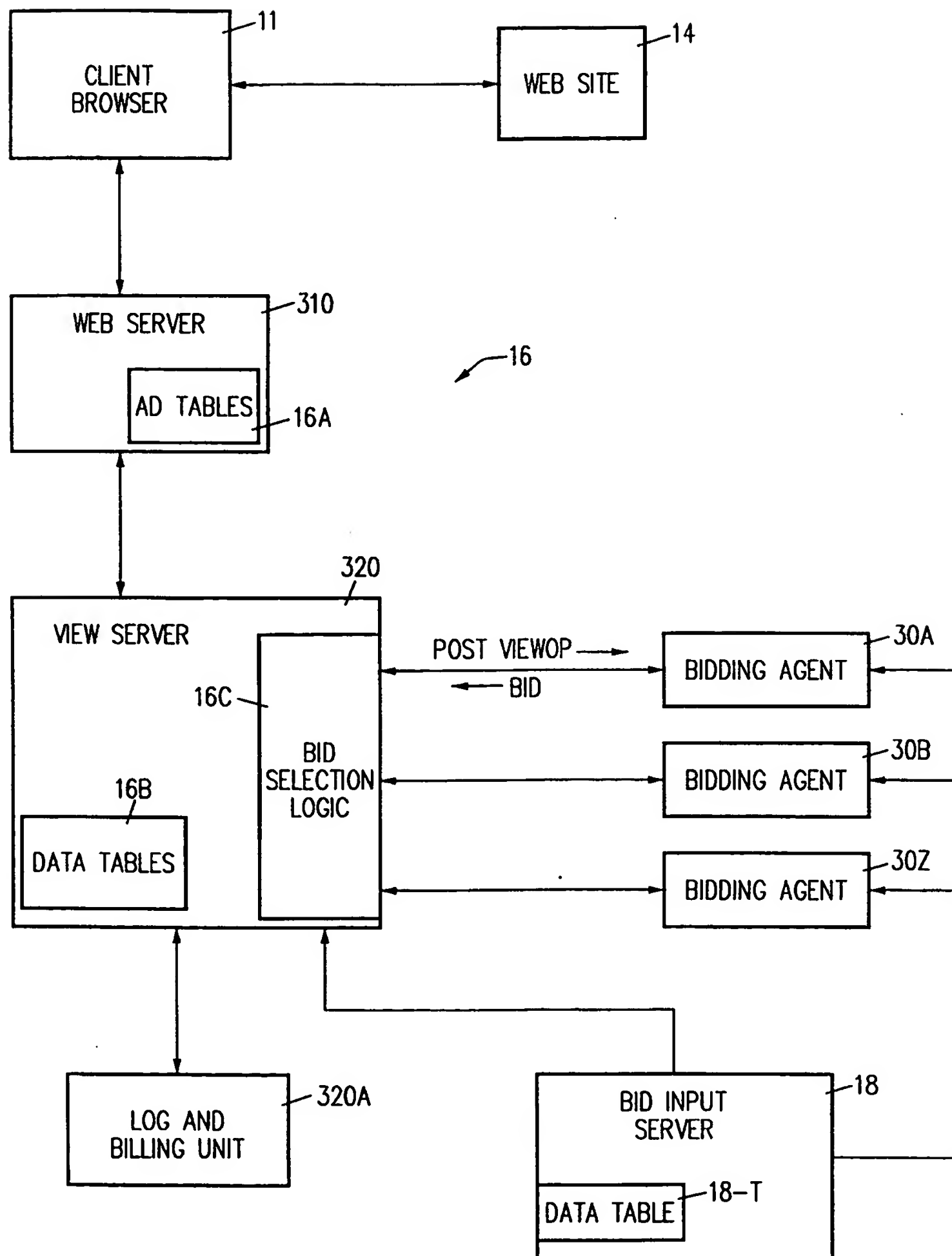


FIG. 3

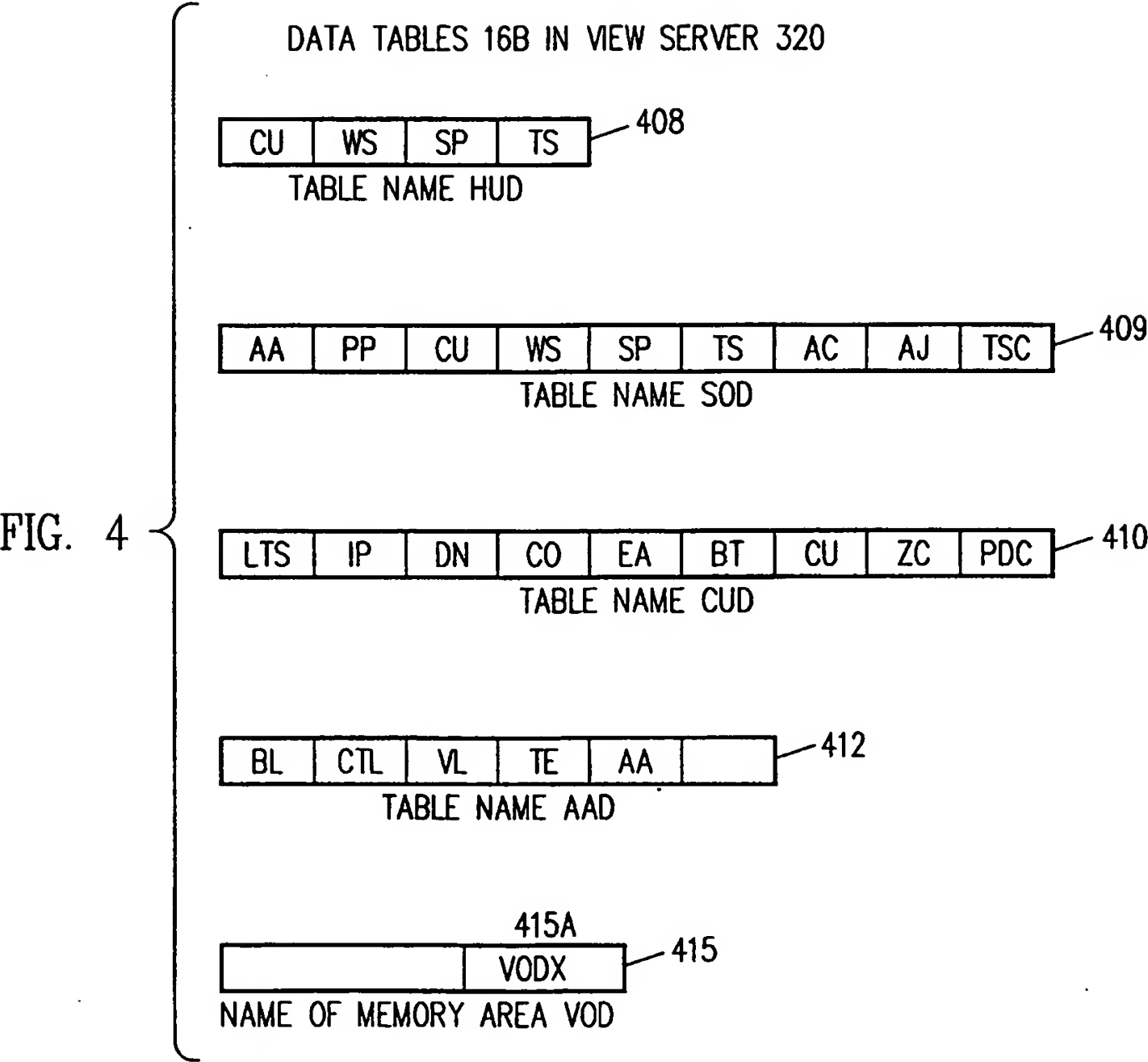


FIG. 5A

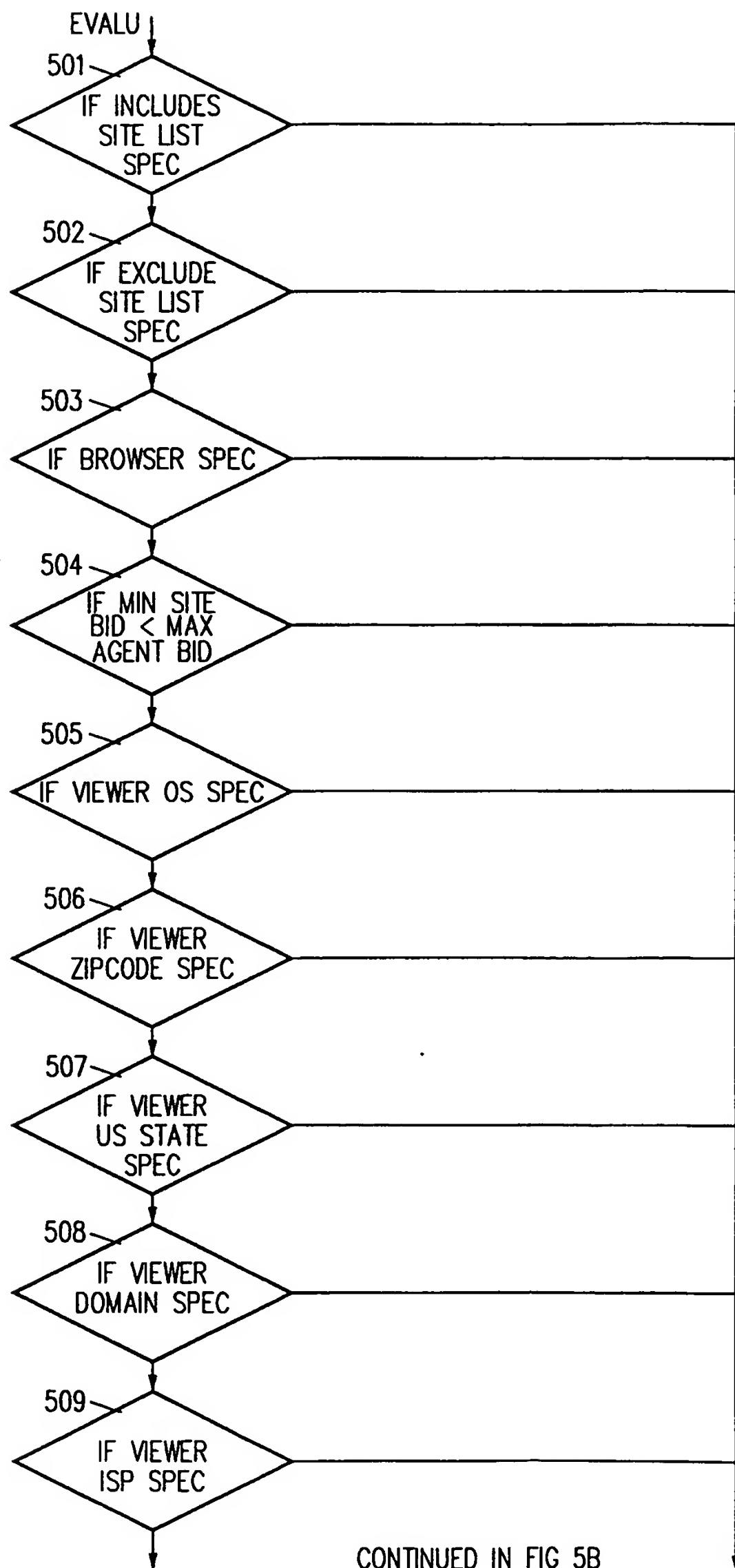
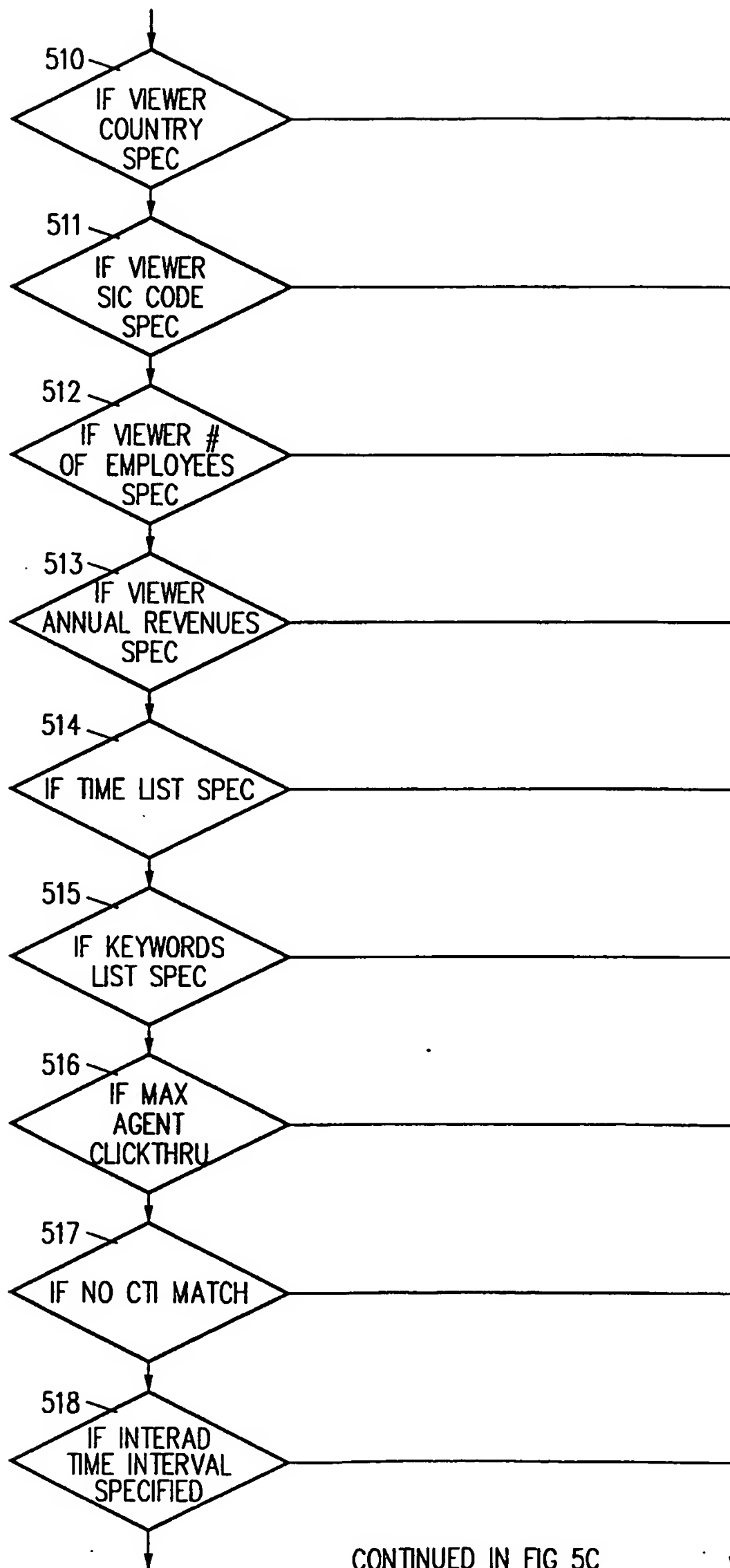


FIG. 5B



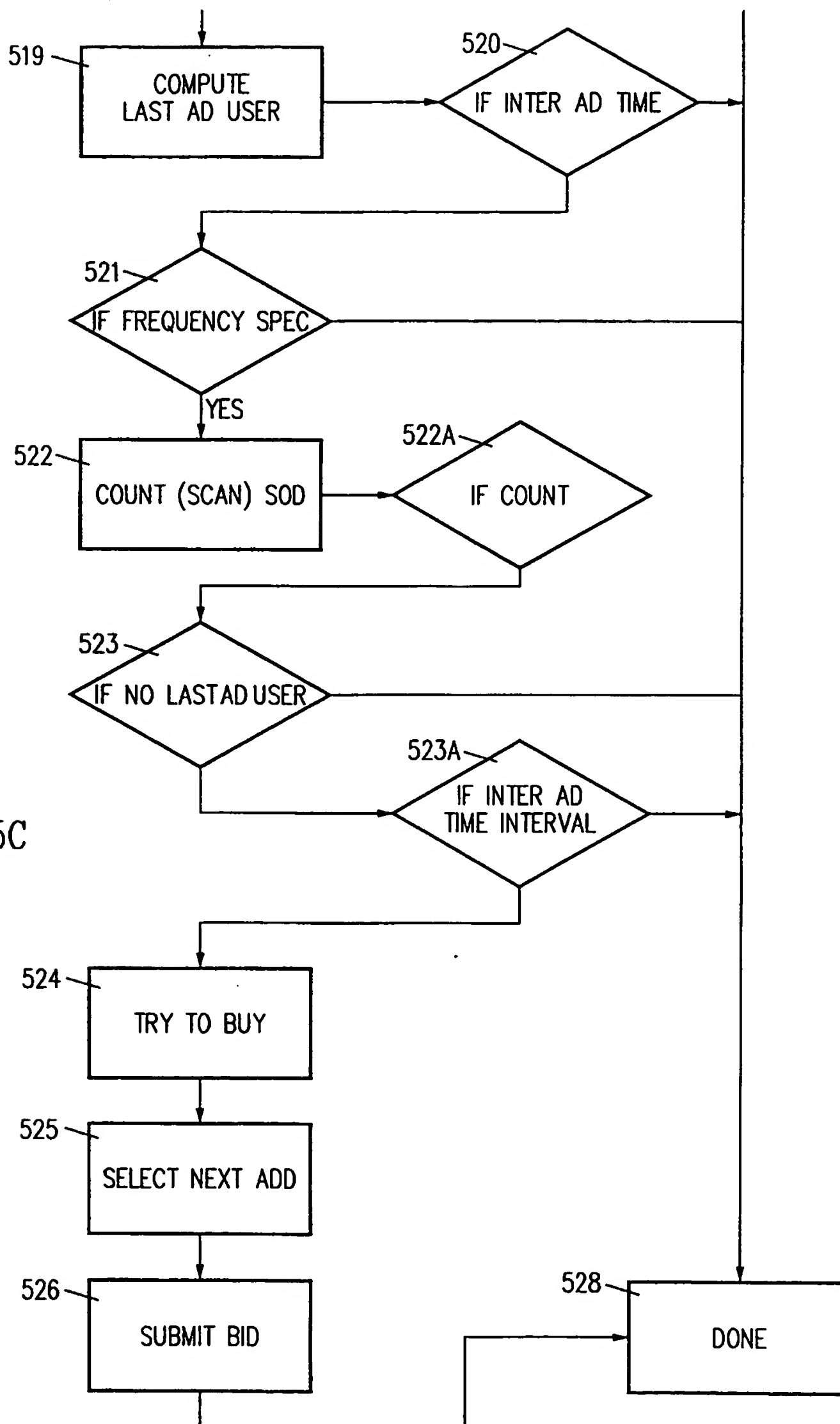
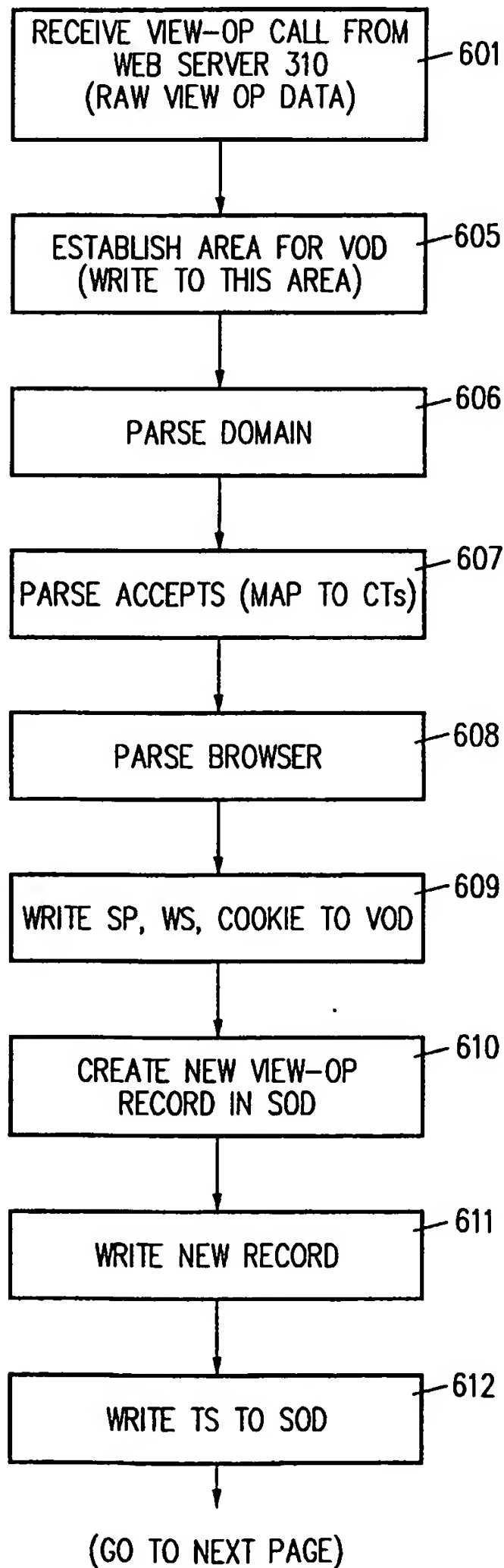


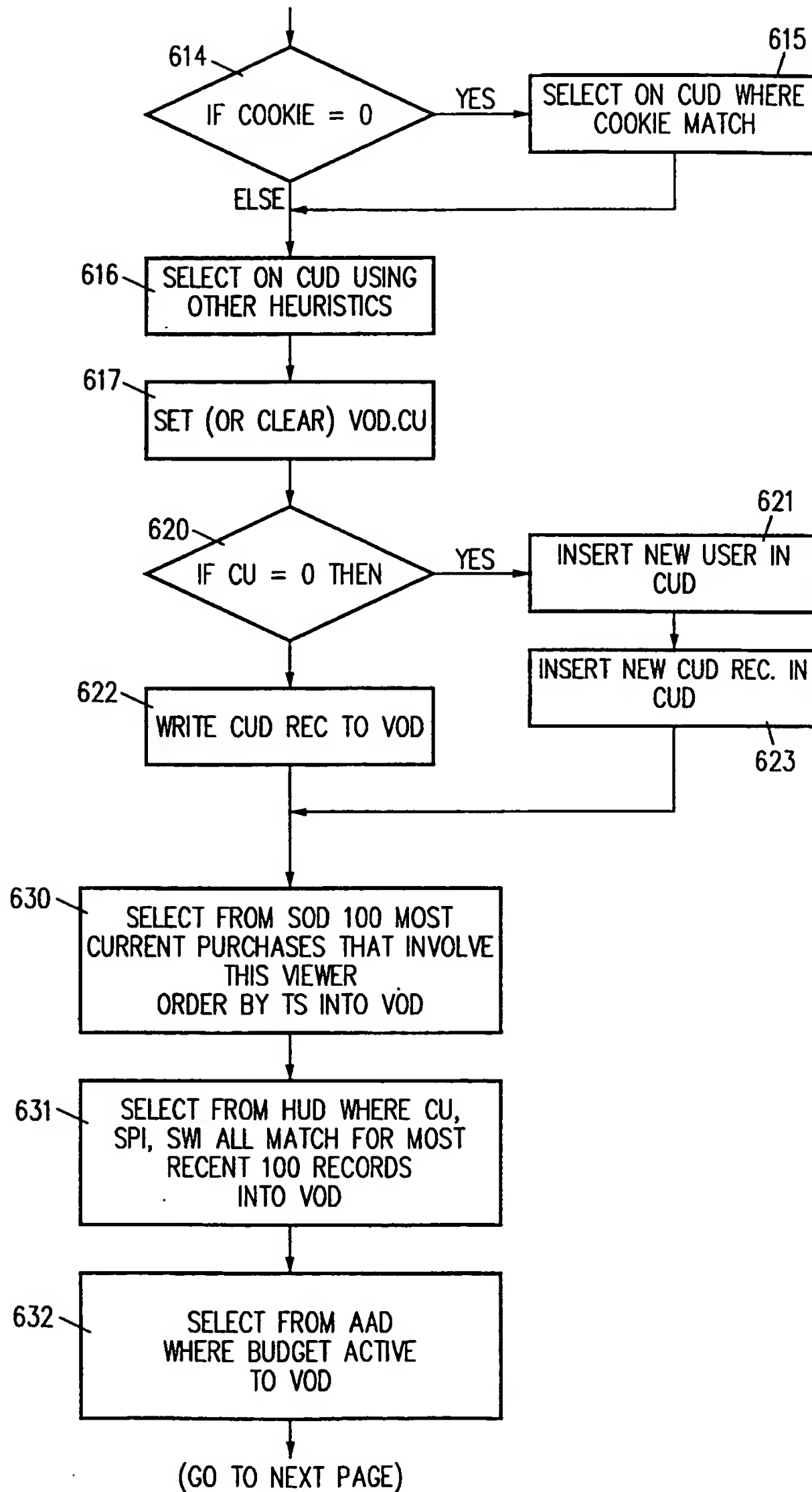
FIG. 5C

PROCESS BEGINS WHEN WEB SERVER 310  
PROVIDES A NEW VIEW-OP TO SERVER 320

BEGIN OPERATION  
FIG. 6A



9/13





10/13

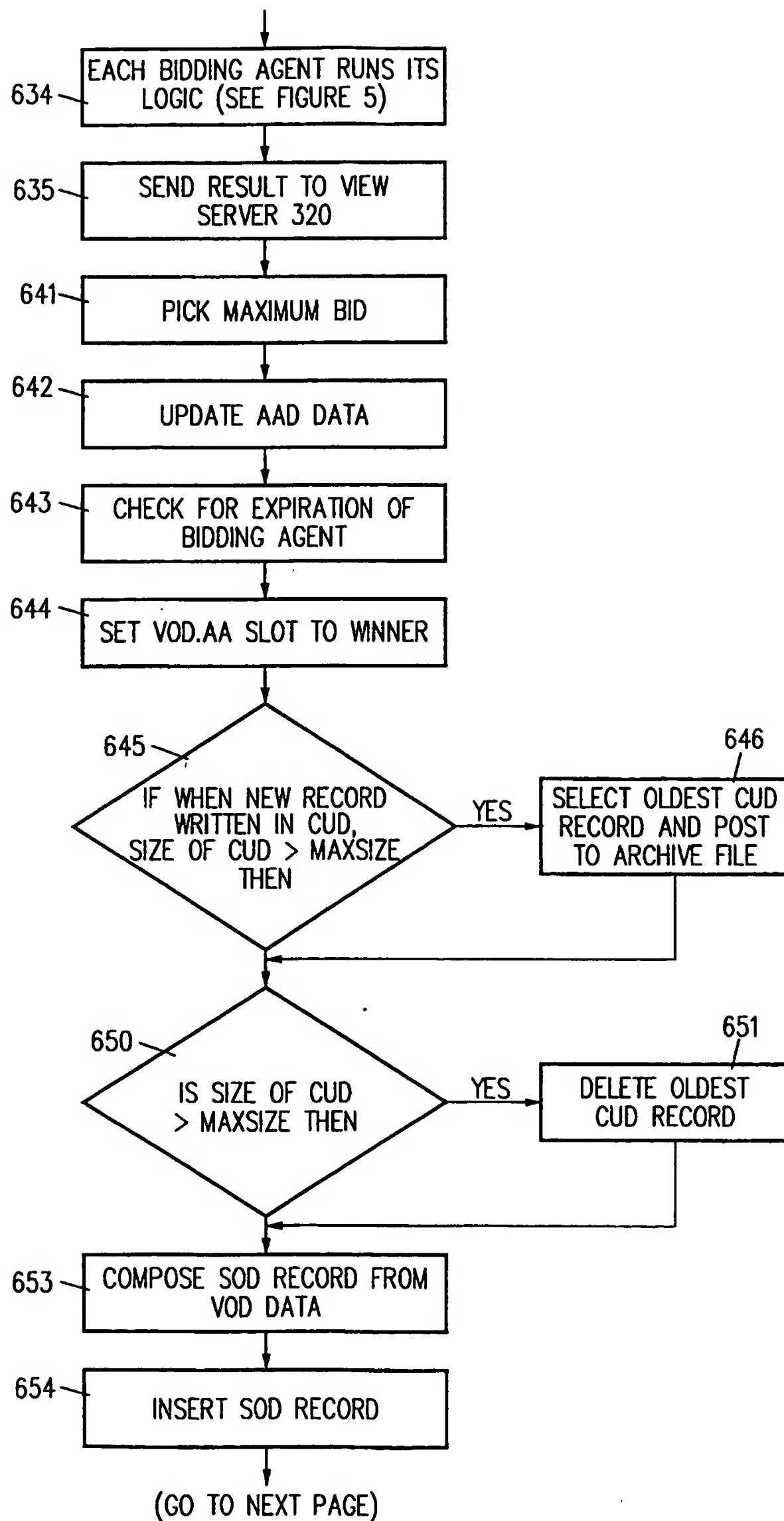
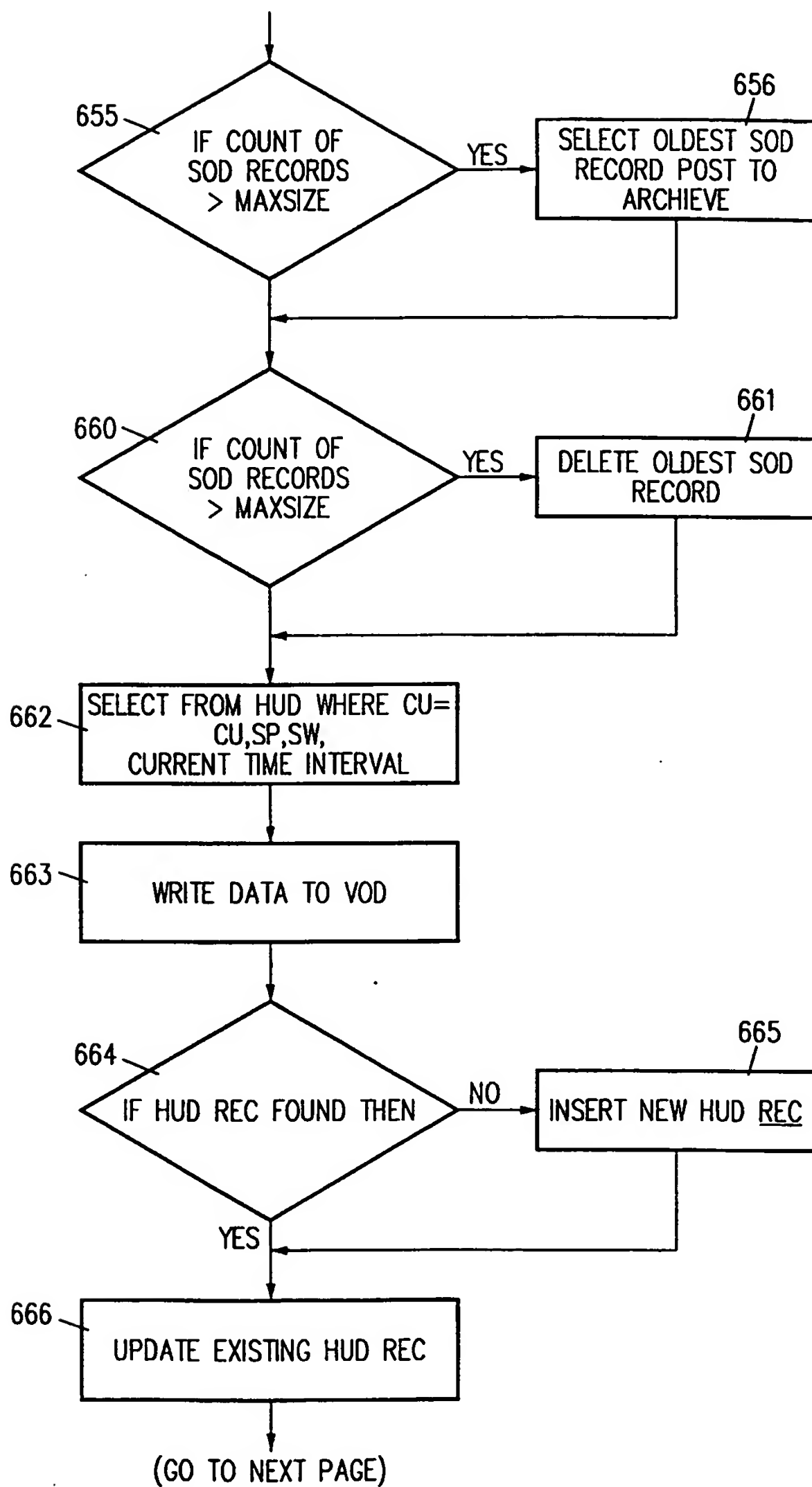


FIG. 6D



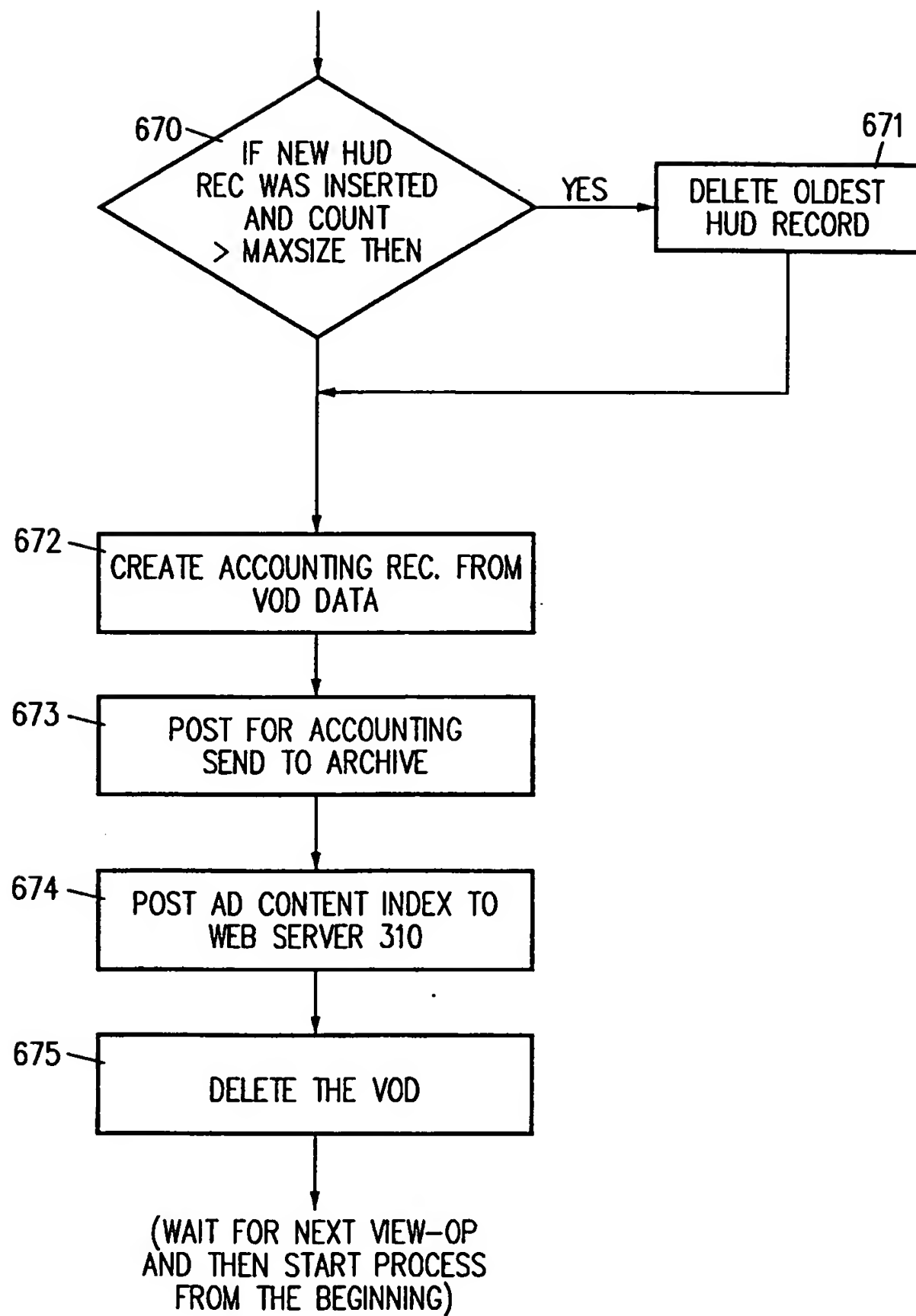


FIG. 6E

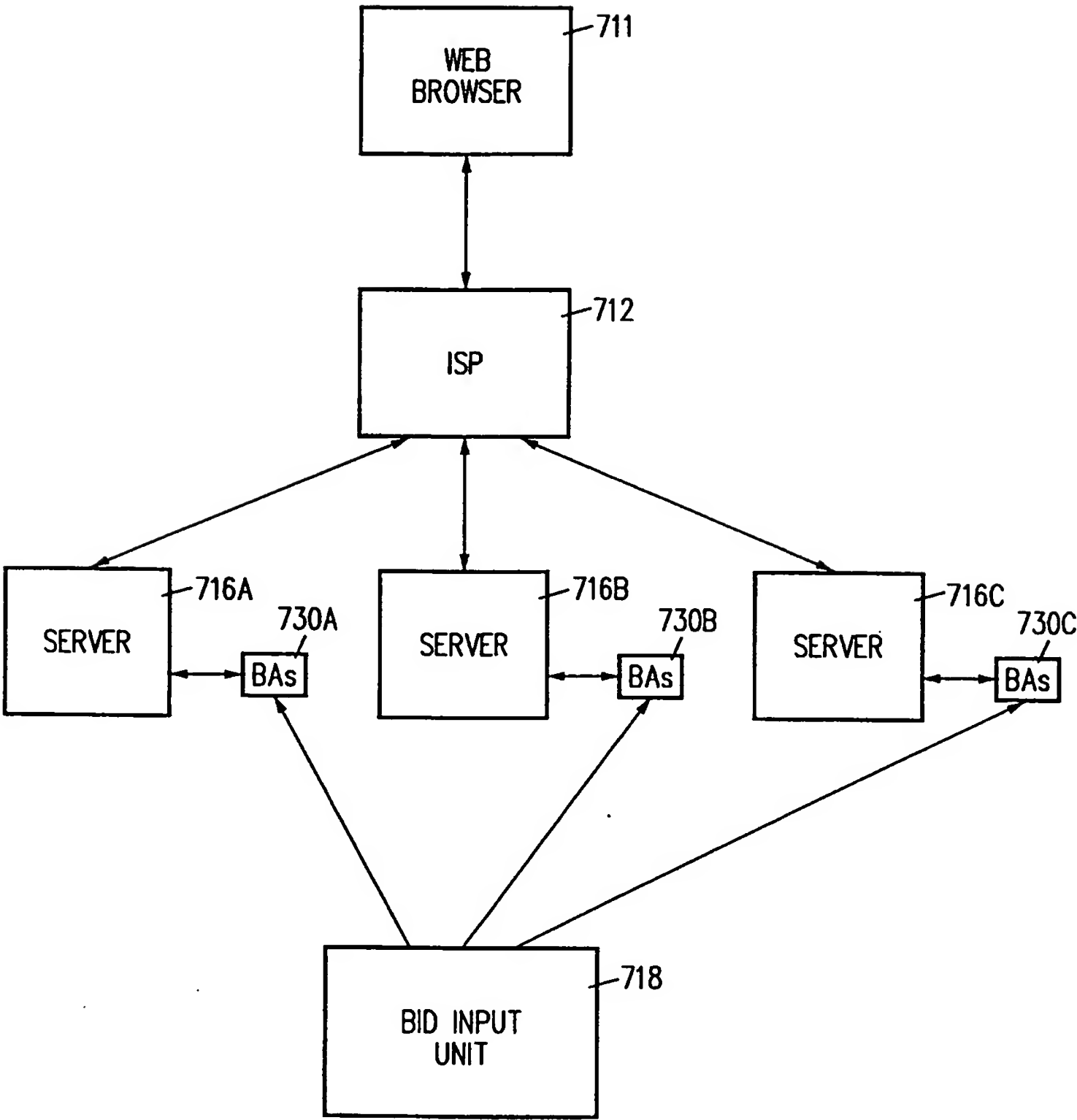


FIG. 7

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/00386

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 17/60

US CL :705/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/14, 26, 27; 707/513

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS:

auction, bid, bids, bidding, advert?

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,105,184 A (PIRANI et al.) 14 APRIL 1992, see entire document.	1-15
A	US 5,584,025 A (KEITHLEY et al.) 10 DECEMBER 1996, see entire document.	1-15

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

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\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\*

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\*

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*A\*

document member of the same patent family

Date of the actual completion of the international search

11 MAY 1998

Date of mailing of the international search report

17 JUL 1998

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